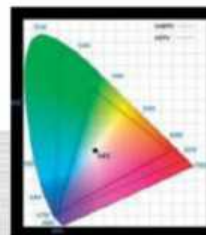


**A STAND-UP VALUE** ▶▶

For \$560 A Pair, Elac's Debut Sounds Like A Million

**NEW TV TECH EXPLAINED**

What You Need To Know Before Buying An HDTV


**FIRST  
LOOK!**  
VIZIO RS120  
120-INCH TV  
**P56**

# SOUND & VISION

Where Technology Becomes Entertainment™ ■ [soundandvision.com](http://soundandvision.com) JANUARY 2016**TOTALLY TABLETOP:** Naim Hits Audiophiles Between The Eyes With Mu-so

## SWEET SURROUND!

FROM SUPERB SOUND QUALITY TO ATMOS  
TO MUSICCAST MULTIROOM AUDIO,  
**YAMAHA'S CX-A5100 PROCESSOR**  
PACKS A LOT IN ONE BOX



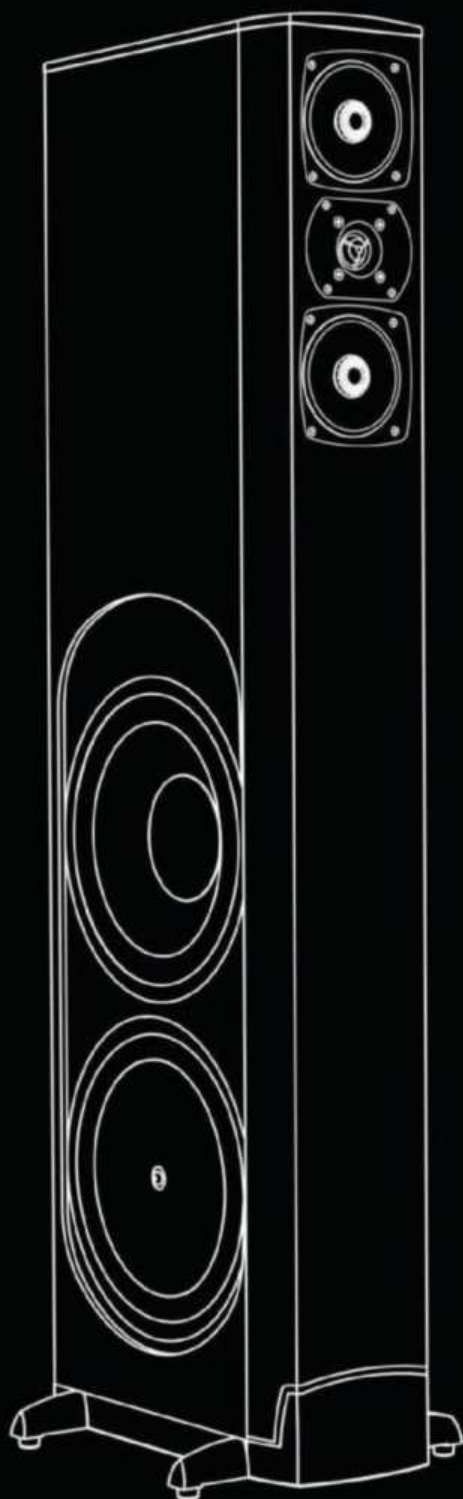
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IS JUST THE PLACE TO PLOP  
YOUR TIRED FLAT PANEL



**HDR ON A  
BUDGET**  
**SAMSUNG'S JS7000  
UHDTV DELIVERS**  
CUTTING-EDGE VIDEO AT  
A PRICE YOU CAN AFFORD





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# Preview

**ON THE COVER** Sweet Surround! Yamaha's CX-A5100 processor packs a lot in one box. Additional gear from Elac, Naim, PSB, and Samsung. Screen image courtesy of Disney.



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The New  
TV Tech



The 4K image has more than four times as many pixels as 1080p HD. It's a generation ahead.

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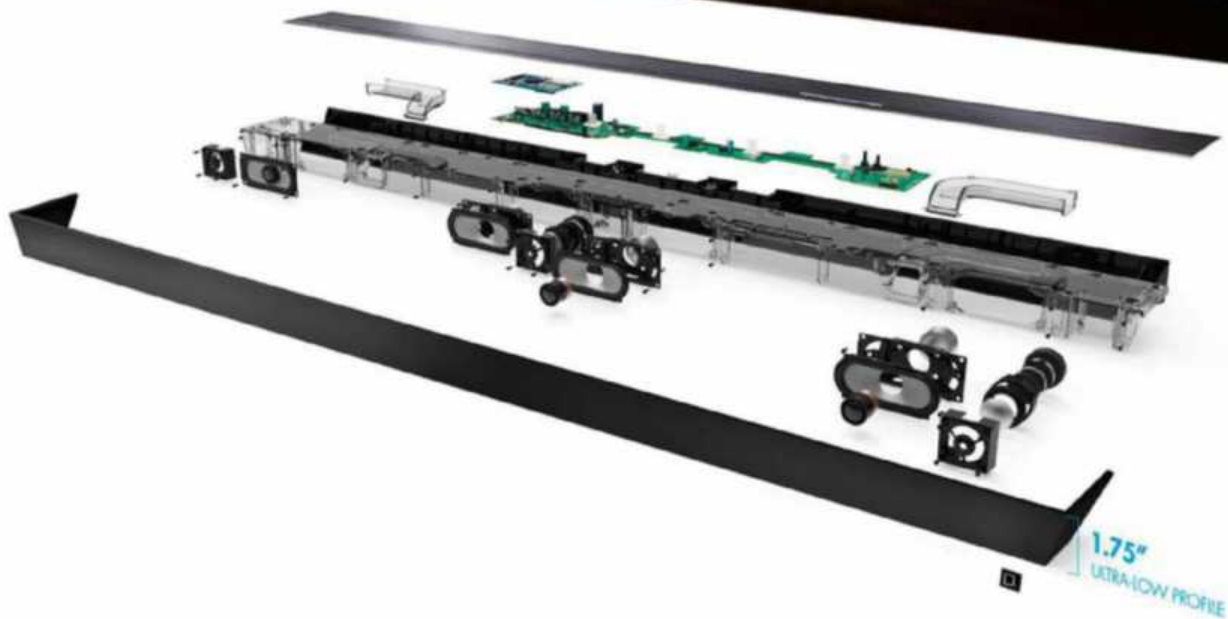
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**D.**  
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# GoldenEar's 3D Array Soundbar is "Absolutely Unbelievable"

— Darryl Wilkinson, *Home Theater Magazine*



3D Array \$999

FF3 \$499

**"Most exciting soundbar demo I heard"**  
— Brent Butterworth, *Sound&Vision Magazine*

We call the SuperCinema 3D Array, quite simply, "an extra-ordinary high-end loud-speaker system disguised as a soundbar." It is designed to combine the form factor of a sleek, stylish soundbar, with the performance of a true, high quality, component system. The complete ultra-high-performance system would include a powered subwoofer and a receiver or separates; plus the 3D Array achieves superb three-dimensional surround performance with or without rear surround speakers. Its 2.7" thin cabinet is constructed of aircraft-grade aluminum and contains six of GoldenEar's signature cast spider leg basket bass/midrange drivers and three High-Velocity Folded Ribbon Tweeters along with our breakthrough 3D Technology that cancels interaural crosstalk distortion for total sonic immersion.



High-Velocity Folded Ribbon Tweeter (HVFR)



High-Definition Cast-Basket Bass/Midrange Driver

**"Awesome just got redefined"**

— Darryl Wilkinson, *Home Theater Magazine*

The 3D Array sounds amazing and the experts certainly agree. Al Griffin of *Sound & Vision* wrote that the 3D Array System, "...delivered at least 90% of my main rig's [Triton Two Towers] performance." Chris Martens of *The Absolute Sound* raved, "...a soundbar system so good that audiophiles might buy it for music playback alone...if asked to recommend a soundbar to please finicky, hypercritical audiophiles, this would be my hands down choice." And *Home Theater*'s Darryl Wilkinson summed it up perfectly when he raved that, "the width and openness of the soundstage was absolutely incredible" calling it "an instant classic" that is "a must-listen-to, top-of-the shopping list, soundbar-to-beat...when it comes to soundbars awesome just got redefined."

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January 2016

# TrackOne

## HDR IS THE REAL DEAL

Brighter highlights is what we didn't know we were missing.



BY ROB SABIN,  
EDITOR

When Dolby announced it was bringing its Atmos object-based surround technology to home theaters, I was quick to acknowledge the significance of the advancement. More often than not, audio and video technology moves in small evolutionary improvements that add up over time. But once in a while, something comes along that's so discernibly better that it commands attention and excitement. Object-based audio—when the equipment and software properly align—brings something noticeable and worthy to the table.

But that doesn't mean it works that way all the time. Sometimes the installation is not quite optimal for the space, or sometimes the content (that is, the surround mix committed to the soundtrack) doesn't really take full advantage of what the technology can do. That's been the case with a few of the first 20-some-odd Atmos titles that have been released on Blu-ray through early November, although the more recent among them have been setting new standards (for example, *San Andreas*, which seems to be getting universally high marks for its encompassing audio effects).

In looking over this issue, I'm struck that HDR (high dynamic range) video is another advancement that will likely fall into that category of noticeable and worthwhile upgrades, but like object-based audio (with its competing Dolby, DTS, and Auro formats), it won't be without its fuzzy launch period when different equipment does different things with different content. HDR comes up in three places in our magazine this month. First, it's an important thread in Al Griffin's overview of new TV technologies you should understand before buying your next HDTV.

Then it comes up in Tom Norton's examination of Vizio's new 120-inch Reference Series television, and it's a topic again in our review of Samsung's JS7000 Ultra HDTV. Both the Vizio and Samsung claim to do HDR, but are for now only able to recognize one kind of HDR-encoded content, and each is qualified (by price and the commensurate technology built into the TV) to deliver HDR to the screen at a different performance level.

This is another way of saying that things appear to be a bit of a mess at the moment, making it difficult for consumers to understand what they're buying and how future-proofed their new HDR-compliant television will be. Nor do we fully understand yet the difference between what will eventually be gold-standard HDR and the lesser forms that will be more widely available. How do we know what we should recommend you buy if there's essentially no software available to test with and little clear information or specifications coming from manufacturers about the HDR performance their sets can achieve?

All of this will settle out eventually, of course; we're waiting for the arrival of HDR-encoded Ultra HD Blu-ray to hopefully give us a firm content standard for each of the different HDR formats being promoted today. But it doesn't detract from the fact that the bright highlights that can be delivered by the best HDR sets with the best HDR UHD content are something we can all look forward to. For the moment, I'm not prepared to say that any old HDR will do—I've seen some very impressive demos that really bring the content to life (notably, Vizio's recent Dolby Vision demos on the new Reference Series) and a bunch of other demos that were far more subtle, if not genuinely "meh." Time will tell us what really works. And then, we will tell you.

*JS*

**HDR will likely be a noticeable and worthwhile upgrade.**

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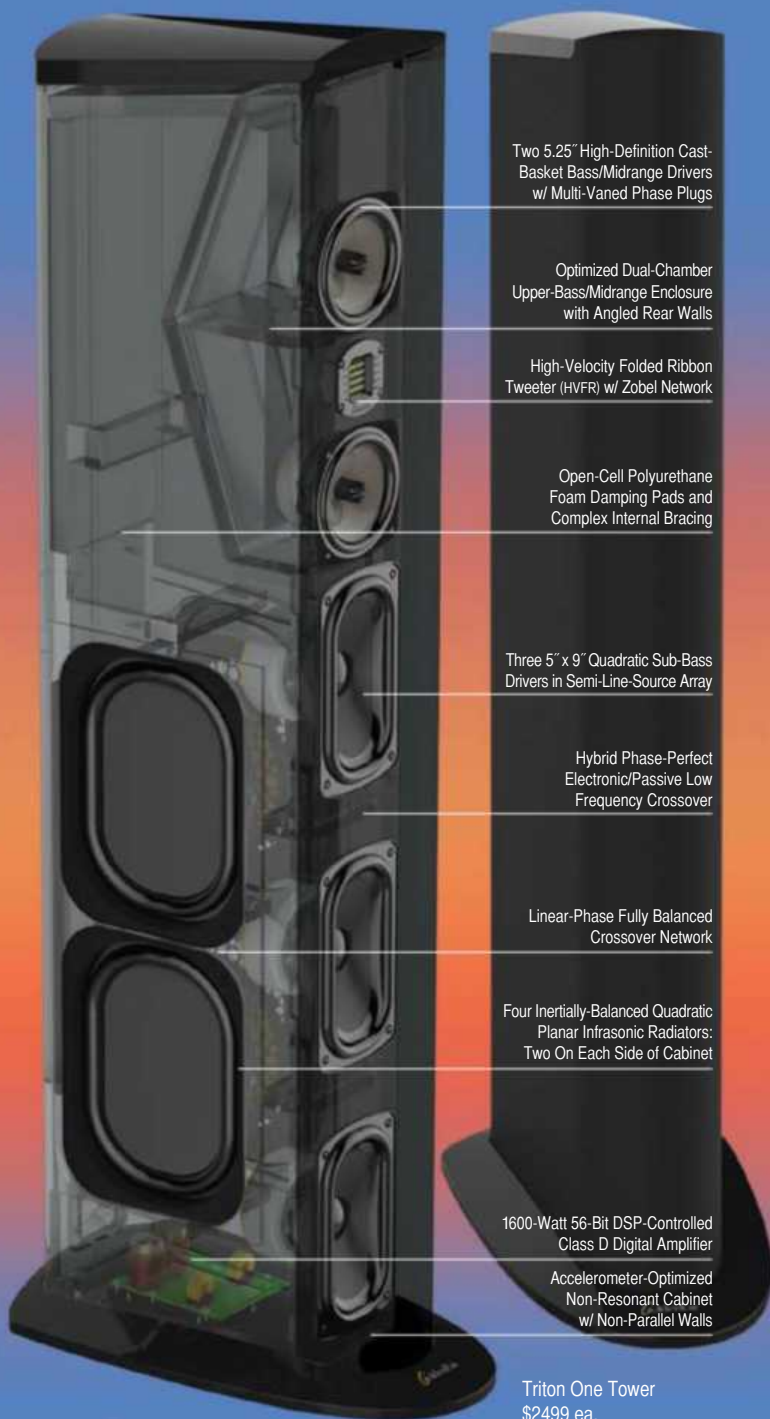


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# GoldenEar has Engineered Our New Triton One to Perform Like a \$20,000+ Super Speaker!

*"Revelatory ... cosmically orgasmic ... astounding performance-vs-price ... these speakers absolutely embalm the competition"* – Darryl Wilkinson, *Sound & Vision*



Two 5.25" High-Definition Cast-Basket Bass/Midrange Drivers w/ Multi-Vaned Phase Plugs

Optimized Dual-Chamber Upper-Bass/Midrange Enclosure with Angled Rear Walls

High-Velocity Folded Ribbon Tweeter (HVFR) w/ Zobel Network

Open-Cell Polyurethane Foam Damping Pads and Complex Internal Bracing

Three 5" x 9" Quadratic Sub-Bass Drivers in Semi-Line-Source Array

Hybrid Phase-Perfect Electronic/Passive Low Frequency Crossover

Linear-Phase Fully Balanced Crossover Network

Four Inertially-Balanced Quadratic Planar Infrasonic Radiators: Two On Each Side of Cabinet

1600-Watt 56-Bit DSP-Controlled Class D Digital Amplifier

Accelerometer-Optimized Non-Resonant Cabinet w/ Non-Parallel Walls

Triton One Tower  
\$2499 ea.

*"Triton One shames some speakers costing ten times as much ... it is an absolute marvel"*

– Caleb Denison, *Digital Trends*

*"Best High-End Value at CES 2014 ... Sandy has created a speaker that defies its price point"*

– John Sciacca, *Residential Systems*

*"Best of CES 2014 ... stunning realism ... the sound was truly grand and majestic"*

– Roger Kanno, *SoundStage*

*"Best Sound for the Money at CES 2014"*

– Jonathan Valin, Kirk Midskog and Neil Gader, *The Absolute Sound*

Introducing Triton One, an evolutionary speaker that builds upon advanced technologies that have made Tritons mega-hits around the world. Stereophile called them, *"A Giant Killer Speaker"* and Robert Deutsch further added, *"it's not unreasonable to compare the sound of the \$4998 Triton One with speakers costing tens of thousands of dollars more"*. This new top-of-the-line flagship was engineered to deliver even better dynamics and bass than the extraordinary Triton Two, along with further refinement of all aspects of sonic performance. How well have we succeeded? In the words of HD Living's Dennis Burger, the Triton One delivers, *"... the sort of upper-echelon performance that normally only comes from speakers whose price tags rival a good luxury automobile"*.

*Triton One "creates visceral, tangible waves of pure audio bliss"*

– Dennis Burger, *HD Living*

Great sound is what it is all about and the Triton Ones deliver, as The Absolute Sound's Anthony Cordesman wrote *"they provide sustained musical pleasure and exceptional realism ... extraordinary sound quality and value ... one of the best buys in speakers ... highly recommended"*. The Ones were specifically engineered to excel with all types of music as well as movies. Best of all, they offer previously unheard of value, as Brent Butterworth wrote in *Sound & Vision*, *"I heard a few people saying the Triton One sounded like some \$20,000-and-up high-end towers, but I disagree: I think they sounded better than most of them"*. Hi Fi's Chris Martens raved the Ones are, *"jaw-droppingly good ... one of the greatest high-end bargains of all time with a dazzling array of sonic characteristics"*. And Darryl Wilkinson summed them up best, *"A Masterpiece ... GoldenEar has fully ushered in the Golden Age of the Loudspeaker"*. Hear them for yourself and discover what all the excitement is about.

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# GoldenEar's ForceField Subs: "Near perfect... a tour de force"

— Andrew Robinson, *HomeTheaterReview.com*



FF3 \$499

FF5 \$999

FF4 \$699

## "Thunderous...Room-Shaking"

— Al Griffin, *Sound&Vision Magazine*

GoldenEar's ForceField subwoofers are true over-the-top super subs that are especially remarkable for their compact size and unusually affordable prices. All three incorporate the same advanced technology and components including: DSP controlled high-power digital amplifiers (1000, 1200 or 1500 watts), ultra-fast long-throw high-gauss magnet structure drivers (8", 10" or 12") and pressure-coupled downward-firing quadratic planar infrasonic radiators. In addition, their uniquely shaped cabinets are not just attractive, but are also purposefully configured for dramatic performance benefits.

## "Extraordinary bass prowess... I've never heard a sub this small go that deep"

— Steve Guttenberg, *The Audiophile*

With their high output capability, stunning impact, superbly musical bass articulation and breathtaking infrasonic low frequency capabilities, the ForceFields have received the highest praise from critics, experts and knowledgeable listeners around the world. Geoff Morrison of Residential Systems raved, "their thunder filled the room." AV Forums praised the, "monstrous output for such a small sub." Mark Fleischman of *Home Theater* wrote, "I was dumfounded" over their, "low frequency barrages with floor-shaking confidence." And to top it off, the British writer Stephen May raved, "this astonishing box can pressure-load a room like an angry Silverback" and Andrew Robinson warns, "Your walls, floorboards, and ceiling may just crap out on you." And, as Dennis Burger of *Tech Tell* observed, they are also, "shockingly musical!"

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January 2016 Volume 81/Number 1

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# GoldenEar's Amazing New SuperSub™ XXL is "A Subwoofer to Die For"!

— Sound&Vision Magazine

*"What struck me most was not the sub's powerful and deep low frequency output, which I expected, but rather it's unusually high degree of tautness, transient speed and control"* — Chris Martens, *The Absolute Sound*



*"Sonic bliss ... remarkably powerful ... they kick ass, totally ... down to the infrasonic"* — Mark Henninger, *AVS*

GoldenEar's new award-winning SuperSub XXL is an elegantly styled, finely finished and surprisingly compact subwoofer. It can effortlessly generate mega-sub-bass pressure waves of extremely high amplitude, while delivering extraordinarily detailed, accurate and precise low-frequency performance that is both highly impactful and extremely musical. Simply put, it is equally adept at recreating dramatic cinematic sound effects, as well as the subtle musical excellence of Ron Carter, Sting or Yo Yo Ma. To achieve this, we have engineered a unique, patent-pending 360 degree dual-plane inertially-balanced active driver and sub-bass radiator topology, and combined it with a very advanced 56 bit DSP controlled 1600 watt Class D digital electronics package originally developed for our award winning Triton One.

*"Blew me away ... the perfect balance of power and control, impact and unobtrusiveness, fury and finesse"*

— Dennis Burger, *HD Living*

Housed within the gorgeous piano gloss black enclosure are two horizontally-opposed 12" ultra-long-throw active drivers and two vertically-opposed 12-3/4" x 14-1/2" planar infrasonic radiators. This dual-plane, patent-pending dynamic inertial-balancing preserves and focuses all the energy produced by the transducers, in order to more effectively move the air in the room, rather than wasting energy moving the box. It also enables you to hear all the fine subtle details in your recordings. The benefit is a new achievement in state-of-the-art subwoofer performance that, not only "rocks the house", as Big Picture Big Sound's Chris Boylan raved, but is also, "strong, pure and controlled" as Sound&Vision's Mark Fleischman wrote.

*"The SuperSub XXL has looks to kill and is built to rock the house when duty calls"*

— Sound&Vision

Best of all is GoldenEar's signature combination of high-end performance, superb build quality, gorgeous styling and extraordinary value. Mark Henninger raved, "The SuperSub XXL ups the ante down low". Secrets of Home Theater's Robert Kozel clearly stated, "... this is a bargain for a sub of this performance". Visit your nearest GoldenEar dealer and experience this super sub today.



SuperSub XXL  
\$1999 ea.



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Introducing the New

# Triton One

from GoldenEar Technology®



\$2499.99/ea

*"With Triton Ones, GoldenEar Technology has fully ushered in the Golden Age of the Loudspeaker"*

*– Darryl Wilkinson, Sound & Vision*

*"In every criterion that matters to me, the speaker simply punches way above its weight class ... there's an awful lot of magic to enjoy here"*

*– Dennis Burger, HomeTheaterReview.com*

*"It provides extraordinary sound quality and value for the money. They have all—or more—of the features and technology that anyone looking for specsmanship could want, but their real merit is that they provide sustained musical pleasure with exceptional realism. Highly recommended"*

*– Anthony Cordesman, The Absolute Sound*

*"It is an absolute marvel ... Triton One shames some speakers costing ten times as much."*

*– Caleb Denison, Digital Trends*

*"Even with your eyes open, it's practically impossible to make yourself realize that you're not listening to living, breathing human beings playing actual instruments in front of you."*

*– Darryl Wilkinson, Sound & Vision*

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# Letters

We welcome  
questions and  
comments

**E-mail them to HTLetters@sorc.com.** Please note: Questions about the features and functions of a particular product are best directed to the manufacturer. Questions about what product you should buy are best directed to a dealer who knows all the details of your system, your preferences, and your personal habits. All submissions are considered the exclusive property of *Sound & Vision* magazine and TEN: The Enthusiast Network. We reserve the right to edit letters for brevity. Due to the volume of mail that we receive, we regret that we cannot respond to every letter.

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# CRUTCHFIELD

### Why Were You a Snot?

I've been meaning for a while to write in about what is meant by resolution and the false claim that 4K TVs have twice the resolution of 2K TVs, so I was pleased to see that someone finally brought up the subject in the November issue Letters ("Yeah, Whatever..."). However, I nearly fell off my chair when I read your response. Yes, I also believe that the "4K has twice the resolution of 2K" claim is manufacturer hype, and I expect the experts (you) to clear this up and tell it how it is to consumers. 4K does not have twice the resolution of 2K, both technically, and also more importantly, from the viewer's perception of the image. How could you possibly blow this off with a "Yeah, Whatever" response? Let's just say that I was extremely surprised and disappointed by your response, as I have come to trust you and your publication over the years.

**Andy Lefley**

Via e-mail

Rob, your reply to Dennis Green's letter about resolution ("Yeah, Whatever...", November, 2015) was inadequate and an unfortunate waste of an extremely valuable teaching opportunity. You had the opportunity to acknowledge the truth in his statements, embrace them, and expand on the subject. We, your readers, have so many questions related to resolution that I feel cheated by your sarcasm. For example, there are no scanning lines on flat-screen TVs, although they were in tube TVs, so how can we describe the resolution of current TVs by "lines" at all? A modern TV can only display any image fed to it with its native pixel count—or is it resolution? And how does a modern 4K TV integrate a 1080i signal into a single digital image, since it doesn't appear to use a line doubler or quadrupler? How does an upconverter work? So much you could explain!

Instead of doing us this great service, you were sarcastic and sounded like a politician stuck without an answer. You said such embarrassing things as, "If you move into the world of visual perception, the technical definition of 'resolution' perhaps changes." Perhaps? What, if not visual perception, are we dealing with when watching a flat-screen TV?

Calling the writer an "uptight physicist" requires an apology as he wrote a letter that added value to your publication. The fact that he is cynical about inaccuracies and choices in vocabulary is simply his frustration that, to him at least, a great magazine like yours could be more





# THE ULTIMATE UPGRADE FOR YOUR TV



Ultra thin (1 1/8")  
Fits flatscreen TVs



BMR delivers a wider sound  
than similarly-sized traditional  
speakers



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## LETTERS

accurate with terms, or at least explain why you did not.

I hope you will not show hubris, but rather, take your lumps, apologize, and offer us, your paid subscribers, a tutorial on the subject. That would be a great service.

**Barry Jay Miller**

San Jose, CA

*My snarky tone with Mr. Green apparently upset a few readers, but aside from being sorry for my cagey language in using the word perhaps in the manner Mr. Miller recounts, I won't make any apology. (Nor did I directly call Mr. Green an "uptight physicist," though if you read my response, I certainly implied that he could be one.)*

*What these letters fail to acknowledge is the arrogant, insulting tone of Mr. Green's letter in the first place, and his obvious broad attack on the audio/video press (and by extension, Sound & Vision) on the points of both editorial integrity and technical accuracy, two things we take very seriously around here. (On that last point, has anybody noticed that we never stopped calling LCD TVs "LCDs" even when everyone else (primarily manufacturers) had dropped that descriptor and inserted "LED" in its place? Or that we've recently dropped the additional LED reference we were using in our headers because we're at the point where all LCD TVs have LED backlights and we feel we no longer need to qualify those that do with those that don't?)*

*Had Mr. Green simply chosen to make the point politely that our industry's convention of equating perceived resolution with pixel count in today's digital displays is technically inaccurate and asked why it's been done, it would have been a different exchange, though my response would be the same: that it is fair, technically, to equate an increase in pixel count with an increase in visual resolution, even if it's not necessarily accurate, as he pointed out, to say that a doubling or quadrupling of pixels equals a doubling or quadrupling of perceived resolution. I do think this was a fair observation, one I hadn't previously acknowledged, and one we will be conscious of going forward. —RS*

### There's No There, There

The piano is an example of an acoustic instrument having overtones higher than 20 kilohertz. I assume that there are electronic tone generators that produce musical tones higher than 20 kHz. The reason I mention this: I recently bought a pair of JBL Studio L830 speakers. Each is equipped with a 1-inch titanium-dome tweeter that crosses over at 20 kHz to a 0.75-inch Mylar dome tweeter that is said to reproduce frequencies from 20 kHz to 40 kHz. However, this is the only piece of



audio equipment I have that exceeds the long-standing upper limit of 20,000 hertz.

Please advise as to what sources of music (radio, audio with ultra high definition television, CDs, DVDs) contain sound frequencies higher than 20,000 Hz, and what equipment (CD players, DVD players, radios, television sets, receivers) are capable of transmitting frequencies higher than 20 kHz.

**Ron Bailey**

Pinson, AL

*RS responds: The extra dome you refer to here is known as a supertweeter, and many have been found through the years on various speaker designs. They are ostensibly included to help produce a more open, airy sound that is somehow attributed to information in the signal that resides beyond 20 kHz. But I asked our audio technical editor and resident audio engineer Mark Peterson to address this question for us. Here's what he said:*

*"The only commercially available audio recordings with the possibility of frequency response much above 20 kHz will be ones compliant with high-resolution audio (HRA) standards, most of which will (supposedly) soon bear a Hi-Res Audio logo. The vast majority will be files to download at 96-kHz and 192-kHz sample rates, but SACD and DVD-Audio discs are also an option.*

*"When it comes to digital audio formats, the Nyquist Theorem rules the day. To paraphrase, it states that to properly reconstitute a signal that has been digitized, the sampling rate must be at least twice the highest frequency of interest. In other words, to reproduce frequencies above 20 kHz, the sampling rate must be at least twice that, or approximately 40 kHz.*

*"In practice, extra tolerance makes for easier implementation, so the sampling rate is usually a bit more than double. In the case of CDs, the sampling rate is 44.1 kHz for what is generally referred to as a cut-off of 20 kHz. Many 48-kHz-sampled recordings also exist, but once again, this makes for a larger tolerance that benefits editing and mastering but adds little information above 20 kHz.*

*"While it can be argued that some (very clean, non-worn) vinyl LPs may have*

*response above 20 kHz, it's difficult to be able to reproduce it repeatedly, and that's if the signal actually made it to the grooves in your particular copy in the first place."*

### ARC Ain't the Answer

What is the point of the HDMI Audio Return Channel (HDMI-ARC) if it doesn't pass through *all* audio? I would like to have my devices connected to

the TV with one audio cable going to the receiver. But, from what I read, HDMI-ARC will only pass through audio up to Dolby Digital 5.1 (maybe even DD-Plus). Being that HDMI-ARC is a high-bandwidth HDMI connection, it should be able to send all the high-end and lossless audio signals (DTS-HD Master Audio, Dolby True HD, Atmos) through it. If I only wanted up to Dolby Digital 5.1, I'd use the simple digital audio connection.

Is there any light you can shed on this? Like, hopefully, I am wrong. Or maybe you know why the HDMI consortium decided to limit the Audio Return Channel.

**James Aylward**

Via e-mail

*A great question, and another answer that I'll credit largely to Mark Peterson. Bottom line: HDMI, specifically with regard to ARC, is not the high-bandwidth audio connection that you think it is, James. According to MJP, HDMI was never intended to have symmetrical data flowing both ways, but was designed primarily as a high-bandwidth one-way interface with only minor data flow expected in the opposite direction to handle basic handshaking and control information. But by version 1.4 (and probably concurrent with the growth of soundbars), it became clear that a more convenient one-cable solution was required to avoid having to connect a separate S/PDIF digital audio cable (Toslink optical or coax) to get 5.1-channel audio back from a TV's streaming platform or off-air tuner to a soundbar or AVR. So a single unused pin on the HDMI connector was assigned to carry basic audio signals back up the cable. The lower-bitrate DD and DTS bitstreams are simply all this connection can physically handle.*

*On the upside, we can argue, at least for the moment, that for an enthusiast, there is relatively little need for ARC except to bring streaming content from the TV's internal platform back to your AVR, and that content (for the most part) is Dolby Digital maxing out at 5.1 channels. I do acknowledge that 7.1-channel DD Plus tracks are now available on some services—one reason why it really makes sense to have an*



outboard HDMI-connected Roku or other streaming media player to originate your content rather than using the TV's internal platform and relying on either ARC or the TV's downconverted stereo optical output (as is often the case). Granted, until recently, we've been stuck with the TV's own streamer for acquiring 4K content from the likes of Amazon and Netflix, but with the release of the Roku 4, that issue goes away.—RS

### Where Is the Bad Stuff?

Why are there never, ever any negative reviews of A/V products? And rarely are there negative comments about even a single aspect of a product. And always, product reviews conclude with a positive recommendation for some group of people in the readership. This observation is across multiple A/V magazines and multiple decades of reading. Is there some unwritten, unspoken rule that we do not offend our advertisers, i.e., not bite the hands that feed us?

Honestly, I do not mean this offensively; it's simply something that's held true in my many years of enjoying and reading about this hobby. Thanks, and keep up the exceptional work.

**Scott Oakley**  
Phoenix, AZ

*This is a fair question that I've addressed in the past, but it's worth revisiting. It gets at the heart of why we choose to review what we review, and the attitude and approach we take to the "art" of reviewing. I can, of course, only speak for us.*

*While it would be difficult to claim that we (or any other magazine or Website that reviews products) are completely immune to the friendships we maintain with publicists and manufacturer reps (some decades long for us old-timers), we do work hard to keep bias out of the reviews. Although we rely on manufacturers both for advertising and (critically) for the product samples we report on, we are not in anyone's pocket. I'm proud to report that our sales team is extremely respectful of the line separating church and state—as some manufacturers have quickly discovered after going straight to our GM/publisher with a complaint about our editorial.*

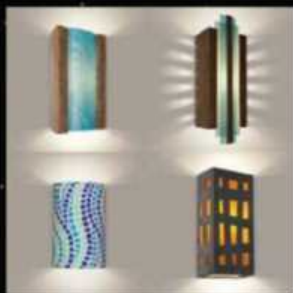
*But the lack of negative reviews does directly reflect both our culling out of stuff that we don't expect to perform well, and the fact that we try to make sure we review products in the context of their intended audience. When there are flaws or particular characteristics in a product that distinguish it, we call them out. Example: Our TV reviewers frequently chastise flat panels and projectors for their lack of*

*contrast and black level, but we acknowledge that less critical viewers may otherwise find a lot to like. Only the very best among them get our whole-hearted recommendation for our enthusiast readership, but you'll usually know which ones those are.—RS*

### CORRECTION

Despite our usual effort to fact-check our reviews with the manufacturer in advance of publication, Epson informed us after we went to press that our review of the LS10000 front projector (November 2015, available at [soundandvision.com](http://soundandvision.com)) contained a technical inaccuracy in its description of the laser engine at the heart of the unit. Though we correctly indicated that it had two blue lasers, we incorrectly reported that each of these was used to excite phosphors to create the red, green, and blue primary colors. In fact, one of these blue lasers is used for the blue primary, while the other is pointed at the projector's single phosphor wheel to convert the blue light to yellow. As we noted in our review, this yellow light is then split into the red and green primaries to complete the required RGB trioka.

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# Perfect focus

## NEW GEAR, TOP NEWS, HOW TO, AND MORE...

Edited by Claire Crowley

# Meet the Maestro

### 15 Minutes with B&O Tonmeister Geoff Martin

I've met enough top speaker designers over the years to know that they're all obsessive. And I mean that in a good way. To design a great speaker, you have to be obsessive. You have to be prepared to spend countless hours in the lab and in listening rooms evaluating and tweaking every conceivable variable to isolate that elusive mix of art and science that yields a speaker capable of fooling listeners into thinking they're experiencing a live performance. A tall order, to be sure. Geoff Martin is not a designer, but as Bang & Olufsen's tonmeister, he plays a critical role in the development of every speaker the Danish company makes. What's a tonmeister? Read on.

**S&V:** For those who are not familiar with the word *tonmeister*, what does it mean?

**GM:** A tonmeister is a recording engineer and producer rolled into one, meaning (s)he knows as much about acoustics, microphones, and recording production techniques as about music performance. In practice, you become a tonmeister by first being a musician (I have a bachelor's degree in pipe organ) and then continuing one's education in physics, acoustics, and electronics, while learning studio techniques.

**S&V:** How (and when) did you become Bang & Olufsen's tonmeister?

**GM:** I did my doctoral studies at McGill University in Montreal. Bang & Olufsen partially sponsored the multichannel audio lab there by providing a visiting professor as well as supplying loudspeakers. After completing my Ph.D., I stayed at McGill for an extra year as a faculty lecturer, but in 2002, I started looking for a job outside of academia. Bang & Olufsen invited me to join the company's newly formed automotive department where I was part of the development team for our first Audi Advanced Sound System. About eight years ago, I moved into the Acoustics department and now focus on home loudspeakers.

**S&V:** Has B&O always had a tonmeister?

**GM:** As far back as I know, Bang & Olufsen has had a person whose responsibility it is to work with the acoustical engineers to ensure that the loudspeakers we produce sound good. Currently, we call that the "sound design" portion of the loudspeaker's development process. While there have been other sound designers before me, I am the first trained tonmeister to have the position at Bang & Olufsen.

**S&V:** Describe the role you play in the company.

**GM:** Normally, about half of my job is directly in the development of a loudspeaker. I'm part of the initial specification process where we make the decisions about the expected performance of the loudspeaker. At that point, I'm helping to translate somewhat vague descriptions of the expectations into numbers that can be used for specifications. I come in again at the end of the development process when we are getting close to starting production. While the acoustic engineers are finishing their work, I help in identifying potential problems with the loudspeaker that they correct. After this, I work at the very end to do the final sound design (or "tweaking" or "voicing") of the loudspeaker.

The other half of my job is quite varied. For example, I write a lot of the acoustical training materials, both for internal and external use, and I write a blog about the technical aspects of B&O loudspeakers and our development process.

**S&V:** You've said speakers should enable us to look at art (experience sound) through a "clear window"—in other words, through a speaker that does not color the sound. How do you realize this goal?

**GM:** When doing the final sound design of a loudspeaker, I begin by sitting in our main listening room and adding filters to improve the loudspeaker's overall voicing (or tonal balance). These filters are essentially a correction for changes in the loudspeaker's sound caused by the room. The issue is that one listening position in one room isn't representative of everyone's experience. So, once that initial tuning is done, we bring the loudspeaker to a different room and start the process from scratch. This is repeated in four or five rooms—and each of these results in approximately 40 to 50 filters that

change the sound of the loudspeaker. We then analyze the results, comparing the filters that were added in each room. Any filters that are different (for example, 55 hertz in one room, but 36 Hz in another) are thrown out, since these are corrections for the individual rooms themselves. Any filter that is similar in all rooms must be either caused by the loudspeaker or by me (since those are the only two constants in the system). Hopefully, it's not me, so the correction that was applied in all rooms is included in the tuning of the loudspeaker. So, we're not averaging the results of the different rooms, we're looking for what is common amongst them.

It's important to note that we don't use the same five rooms for every product, since different loudspeakers are used differently. When we're done, the result is actually a loudspeaker that does color the sound—but does so intentionally to offset the acoustical effects of a typical living space.

**S&V:** Tell us about B&O's new room compensation technology.

**GM:** Active Room Compensation (ARC) is a feature that was introduced in our newest loudspeaker, the BeoLab 90. It's a new technology that will give our customers the ability to measure the resonant effects of their listening space at listening positions and to automatically create compensation filters to correct for these effects. Our previous room compensation system, Adaptive Bass Control (ABC) in the BeoLab 5, was similar but could only correct for the entire room on average. ARC gives the user the option to measure and correct specific or combined "zones."  
—Bob Ankosko

*An extended version of this interview appears on [soundandvision.com](http://soundandvision.com).*



# This Just In...

By Mark Fleischmann

## Samsung Supports HDMI 2.0a

as an update for 2015 SUHD quantum-dot TVs and other UHDTVs. That'll enable the TVs to accept the metadata stream that enables HDR's black-level and color improvements...



### The First MQA Music Player

is Pioneer's XDP-100R (price unknown at press time). Meridian's MQA technology offers high-resolution audio in reduced file sizes...



### AT&T Is Offering \$500 Credits

to customers of its recently merged U-verse and DirecTV divisions if they change their wireless plan to AT&T. "I want Comcast to really regret the fact that they don't own a wireless asset," says an AT&T executive...

### Comcast Added Video Calling

to its Xfinity Connect app for Android and iOS phones and tablets. Xfinity Voice subscribers can also access e-mail, voicemail, and text messages in addition to unlimited voice calls via Wi-Fi...

### TiVo and Cox

Communications have signed a pact that makes the cable operator's video on demand accessible from store-bought TiVos via broadband. The software update will reach all Cox customers by year end...

### TiVo Lite

combines client devices with mobile apps for Android and iOS to support live TV, VOD, and streaming, both in the home and outside. Which will be the first U.S. pay-TV operator to go for it?...

### Verizon's Free Mobile TV

platform, Go90, is ad-supported and aimed at millennials. It includes live events, prime-time TV, and original Web series from Comedy Central, ESPN, and other networks—but not the entire lineups of those networks...

### Sinclair Stations Went Dark

on the Dish Network in the latest retransmission-fee brawl, blacking out 129 stations and 79 markets in 36 states. Like other pay-TV operators, Dish is caught between a rock (ravenous content owners) and a hard place (parsimonious cord cutters)—and the most likely escape route is via new federal legislation and FCC regulation...

### Out-of-Market TV Stations

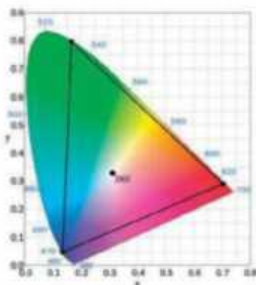
may be carried on pay-TV systems under rule changes being examined by the FCC. Eliminating network nonduplication and syndicated exclusivity rules might help viewers when a retransmission-fee tussle blacks out local network affiliates...

### Amazon Added Offline Playback

to its Prime Video streaming plan, so that users of the Android and iOS apps can download now and watch later. If Amazon can do it, why can't Netflix?...

### Wide Color Gamut Displays

are just 3 percent of the market now but are expected to hit 25 percent by 2020, predicts IHS. Analyst Richard Son says panel makers are clearing technical hurdles, TV makers are interested, and supportive display technologies like OLED and quantum-dot LCD are falling into place...



### Amazon's Ultra HD Move

comes through the latest version of the Fire TV box. Cool feature: It allows instant starts by predicting what you'll want to watch and caching part of it...

### Intent to Cut the Cord

has grown from 1.9 percent to 3.7 percent in five years, says a Frank N. Magid Associates study. However, 61 percent of respondents said they'd buy a "skinny" cable package, choosing their own channels at reduced cost—are you listening, cable operators?...

### Pay-TV Subscribers Are Restless,

says a Digitalsmiths survey which found 46.6 percent of them are planning either to switch to another provider or cut the cord altogether. Cost accounts for 61.6 percent of this dissatisfaction and 7.7 percent have actually switched in the past three months...

### Connected Devices Are in Half

of U.S. homes in the second quarter of 2015, reports the NPD Group, including smart TVs, game consoles, Blu-ray players, and streamers. Smart TVs have risen from 34 to 45 percent of the market...

### TV Everywhere Growth

is slowing, increasing a mere 63 percent as of second

quarter 2015, versus 246 percent the year before, according to Adobe Digital Index. "Some of the friction in the process of setting up TV Everywhere or figuring out which device to use might be causing a slowdown," says analyst Tamara Gaffney...

### Global TV Shipments Declined

by 8 percent in second-quarter 2014, versus the same time last year, their biggest drop since 2009, reports IHS. LCD sales have not compensated for the exit of CRT and plasma, though UHDTVs managed a 197 percent rise...

### Dish Network's My Tech

is a Web-based tool that enables subscribers to track service techs on an interactive map as they hurtle toward your home. The technician's name and picture pop up an hour before arrival...



### Microsoft Zune

ended its download and streaming services on November 15. What, Zune was still alive?...



# Hands**on**

## Serene Audio Talisman Desktop Speaker

By Bob Ankosko

# Serious Style... and Sound

**PRICE \$395**

### THE DECISION TO FEATURE

Serene Audio's Talisman in our Premiere Design section (November) was a no-brainer. We've seen lots of unusual speakers over the years but nothing quite like the squiggly lines of Sia Rezaei's imaginative design. You might hate it, but I find it inspiring. And it's a desktop speaker that's only 8 inches tall. I don't know about you, but I spend way too many hours pecking away in front of a computer, usually with Pandora playing in the background through a pair of cheap (no excuses, I know) computer speakers. The promise of great sound from visually striking desktop speakers appeals to me, so I asked Rezaei to send me a set of Talismans.

As I removed the speakers from their custom-fitted bamboo carton, I was struck by the fit and finish of these amazingly compact speakers. Hand-built in a workshop in picturesque Vancouver, British Columbia, the cabinets are made of three-quarter-inch-thick bamboo and wrapped with upholstery-grade faux leather. It's a classy look.

### Inner Beauty

Rezaei, a self-avowed "audio geek" who has been building speakers since he was a kid, set out to build an "audiophile-worthy setup" for his desk. It was a trial-and-error process that produced a couple of "less than worthy" iterations that he ended up giving as gifts to what he described

### AT A GLANCE

#### **+** Plus

- Striking design
- Excellent build quality
- Impressive sound
- Subwoofer output (for gamers and bass hounds)

#### **-** Minus

- A remote control would be nice (for some applications)

as less discerning listeners. He ultimately settled on a crossover-less design (detailed on [sereneaudio.com](http://sereneaudio.com)) that couples a carefully chosen 3-inch driver with a home-grown DSP-controlled amplifier in a ported enclosure.

Using a single full-range driver results in a more coherent sound that is projected evenly in space, according to Rezaei, who explains how and why he uses DSP in a Note to Audio Purists on the company Website:

"If you are a purist reading this, the word DSP might give you shivers! After all, DSP is a device that manipulates the signal, and the purist in you argues any manipulation of the signal is evil. To be honest, that's how we felt. However, DSP is a tool, and like any tool, if utilized properly, it can do wonders. We have carefully used DSP only to help the speakers stay true to the original mix, and not to try to 'improve' or 'enhance' it."

### Back at the Desk

Rather than subjecting the Talismans to the quirks of my prehistoric desktop computer, I equipped my Windows 7 laptop with the outstanding AudioQuest DragonFly v1.2 USB digital-to-analog converter and downloaded AIX Records' superb *Ultra HD-Audio Sampler* from iTrax to set the stage for what I hoped would be a stimulating listening session. Setting up the speakers was a simple matter of connecting the power cable to the right speaker, running a cable between the Talismans, and connecting the speakers to the DragonFly using the supplied minijack cable.

I clicked on the play button and leaned back in my chair. Within seconds, I knew these were serious speakers. I closed my eyes and let the AIX sampler run its course, impressed by Laurence Juber's shimmering acoustic guitar rendition of "Strawberry Fields Forever" and Lowen & Navarro's laid-back "Cold Outside," not to mention Carl Verheyen's Stevie Ray-esque blues romp on "Lone Star" and the enchanting orchestral textures of Ravel's "Pavane for a Dead Princess" (Zdenek Macal conducting the New Jersey Symphony Orchestra). With minimal effort, I had just created a desktop system capable of full-bodied, nuanced sound that you just don't expect to hear from "computer speakers." Impressive.

Ah, but there's nothing that says the Talismans can't be used for a compact, secondary music system, so I moved them onto a cabinet in my living room and jacked in my iPod. Again, I was impressed by sound that was spacious and well balanced, with surprisingly robust bass for speakers of this size. I can't say that what I heard sounded as smooth as those sparkling 96-kilohertz/24-bit AIX recordings (all FLAC), but it was more than decent as I ran through a medley of

### RATING

#### Serene Audio Talisman Desktop Speaker

Performance ★★★★★  
Features ★★★★★  
Build Quality ★★★★★  
Value ★★★★★

### THE VERDICT

The extraordinary Talisman speakers take desktop music to a new level.



deep tracks ranging from Titanic Love Affair's "Breakin' Down the Walls" (1991's *Titanic Love Affair*) to Tokyo Rose's brilliant "You Ruined Everything" from 2003's *Reinventing a Lost Art*. Titanic's signature guitar crunch was deliciously intact, as was the reverberant crack of the snare and the layered vocal/guitar buildup leading to the emotional bridge of "You Ruined Everything." At times I found myself craving more bass, which is precisely why Serene provides an auto-detecting subwoofer output—it will hold special appeal for gamers.

Serene Audio's Talisman is an extraordinary-looking and -sounding speaker guaranteed to transform ordinary desktop listening into a musical adventure.



### SPECS

**Drivers:** 3 in full-range driver in a ported cabinet • **Amplifier:** 2 x 20 watts • **Controls (back panel, right speaker):** Volume knob (push for on/off) • **Dimensions (WxHxD, inches):** 8 x 5 x 6 • **Net Weight (Pounds):** 10 • **Connections:** 3.5mm minijack analog audio input, minijack headphone output, RCA subwoofer output with auto-detection and 120-Hz crossover • **Accessories:** AC charging cable, multipin cable (runs between speakers), minijack audio cable • **Finish:** Solid bamboo with faux leather wrap • **Warranty:** 5 years



Serene Audio • [sereneaudio.com](http://sereneaudio.com)



# The Connected Life

JOHN SCIACCA

## The State of Surround from CEDIA



The event formally known as the CEDIA Expo but which was called the Future Home Experience this year, and henceforth will just be known as CEDIA, happened in Dallas October 15–17. Many of the country's finest custom installers—18,700 in all—gathered to receive top-flight education and check out the latest products and technologies from 510 manufacturers.

This was my 17th Expo-not Expo and once again, the big theme that stuck out to me while walking multiple miles at the Kay Bailey Hutchison Convention Center was how next-generation, 3D audio formats are the driving force for the home theater market.

While Dolby Atmos was just a fledgling technology at last year's show—with no actual home content available—there are now nearly 25 Atmos-encoded Blu-ray titles available, with more coming all the time. Atmos is now supported by every major manufacturer, with Sony, Anthem, and AudioControl all launching their first models at CEDIA. Further, pricing for Atmos integration has come way down, with Onkyo offering an Atmos A/V receiver for under \$400.

The largest competing format is DTS:X; however, it has been slow to get off the ground, and no manufacturer I spoke with expected to be delivering it before year's end. Still, nearly every company that is supporting Atmos is also including DTS:X and will be offering DTS:X as a free firmware upgrade once the codec is finalized (starting at \$480 from Denon). Since DTS:X can utilize the same speaker configuration as Dolby Atmos, this won't pose any difficult decisions for

**Next-generation 3D audio formats are the driving force for the home theater market.**

customers, who will be able to enjoy whichever audio format a disc provides.

The third audio format is the lesser-known Auro-3D. While more popular in Europe where it is often used for music, Auro has seen slower adoption from A/V manufacturers. This is likely a combination of Auro-3D calling for a radically different speaker layout and additional licensing fees, not to mention its demanding a significant amount of DSP horsepower and memory, making it more challenging to implement. Denon and Marantz both offer Auro-3D as a paid (\$199) upgrade on higher-end models (five from both companies) but are currently the only companies doing so.

There weren't many Auro-3D demos at CEDIA, but those that I heard had a wonderfully natural sound quality, and the "Voice of God" channel—a speaker that sits directly over the listening position—really does a terrific job of placing you in the middle of the action. Auro told me a Blu-ray movie announcement would be coming soon.

Other than the Denon and Marantz models with upgrades, getting a processor that handles all three formats is going to cost you. Auro manufactures three models ranging in price from \$11,400 to \$19,580. Trinnov, Datasat, JBL Synthesis, and Steinway Lyngdorf all have processors supporting all three codecs with prices at prices around \$20,000 and up.

Nearly every "consumer" immersive audio system maxes out at 11 channels, generally notated as 7.1.4, and most of the CEDIA demonstrations used this layout. However, for larger rooms, the Trinnov, Datasat, JBL Synthesis, and Steinway Lyngdorf models can support far more channels. JBL Synthesis demonstrated its new processor driving a 13.4.11 system, and the Trinnov Altitude 32 can handle up to 32 channels.

If adding ceiling speakers isn't possible, both MartinLogan and Klipsch showed new Atmos-enabled speaker modules. Designed to sit on top of front and surround speakers, these modules fire the overhead information up to your ceiling where it is reflected back to the listening position. Klipsch also demonstrated the Reference Premiere RP-280FA, a floorstanding tower with an Atmos-enabled module built in. And if you have in-wall speakers, SpeakerCraft debuted the Atmos 100, the world's first in-wall Dolby-certified Atmos module. These kinds of speaker modules—and the others already on the market—should work equally well with DTS:X.

While Dolby suggests *not* using all in-ceiling speakers for an Atmos system, both GoldenEar Technology and Origin Acoustics did just that, with impressive results. GoldenEar featured a 7.1.4 system and Origin showed a 5.2.4 system. While the soundstage seemed slightly elevated at first, my brain quickly reconciled the audio to the picture, and the results were quite impressive.

Finally, Yamaha's YSP-5600 is the first soundbar that is both Dolby Atmos and DTS:X enabled. I've yet to experience this bar in person, but I'm familiar with Yamaha's "beam steering" DSP. If anyone can pull off a successful soundbar implementation of this, it's probably Yamaha.



## Dolans Sell Cablevision

The Dolan family has sold Cablevision, the New York metro area cable operator, to Altice, a European telephone company. If Altice's pending acquisition of Suddenlink Communications also goes through, the result will be the fourth biggest cable operator in the U.S. Cablevision was founded by Charles Dolan in 1973 and was the first cable operator to offer a triple-play package. The \$17.7 billion deal includes *Newsday*, Long Island's prestigious daily newspaper, along with other news and business divisions—but the Dolans will hold onto AMC and Madison Square Garden. Is the smart money getting out of cable?—MF



## DTS:X Coming to Movie Theaters

Look out, Dolby Atmos. Another object-oriented surround sound system is coming to town. The DTS:X system hit Carmike Cinemas—owned theaters in September with Lionsgate titles *American Ultra* and *Sicario* and in November with *Mockingjay: Part 2*. Carmike upgraded seven theaters in Georgia, Colorado, Illinois, Tennessee, California, and Alabama. DTS:X and Atmos both enable soundtrack mixes to use metadata to steer objects around a three-dimensional soundfield. In addition to its theatrical debut, DTS:X is also following Atmos into home theaters with compatible A/V receivers and Blu-ray Disc releases.—MF



# Hands**on**

## AudioQuest NightHawk Headphone

By Steve Guttenberg

### Flying High

**PRICE \$599**

#### EVERYTHING ABOUT THE

AudioQuest NightHawk headphone, from its materials, design, and sound, differs from what came before. Take a gander at those ear cups: They're made from something called Liquid Wood. Don't worry, they're not the least bit squishy or soft. The cups are crafted from sustainable plant fibers that are liquefied and precision injection-molded. Then their insides are elastomer-coated to minimize resonance. The ear cups also feature a 3D-printed grille, inspired by the underlying structure of butterfly wings, and the grilles are said to reduce the cups' internal reflections.

The NightHawk's 50mm biocellulose driver was designed by

#### AT A GLANCE

**+** Plus

- 50mm biocellulose drivers
- Liquid wood ear cups
- Deliciously comfortable

**-** Minus

- Cable much too long for portable use

AudioQuest's Skylar Gray with low distortion in mind. Biocellulose sounds very different than more commonly used Mylar and other types of thin-film drivers found in dynamic and planar magnetic headphones, says Gray. I agree, and I'll have a lot more to say about that later in this review.

The ear cups' rich finish looks spectacular, and rather than mount the cups on conventional pivoted yokes, the NightHawk's are suspended by four elastic bands to better conform to any head or ear shape. That's not just

theory—the NightHawk is one of the most comfortable headphones I've worn.

It comes packed in a beautifully finished, heavily padded storage case that also contains two 8-foot headphone cables. They're both terminated with 3.5mm plugs, and you get a silver-plated 6.3mm home adapter plug. I opted for the thicker audiophile-grade cable for most of my listening tests, a scaled-down version of AudioQuest's high-end Castle Rock speaker cable. That one is for home use, and the thinner, more flexible cable is for portable use. Unfortunately, it's also 8 feet long, which is much too long; a shorter cable would be a lot easier to manage.

What about the sound? Where other high-end headphones *zig*, the NightHawk *zags*. I've listened to nearly all of the top contenders, and here's what I've learned: No headphone sounds exactly like real music. I will say this, NightHawk has more lifelike body and soul than most headphones, with no midrange "push" or high-frequency emphasis. On Frank Zappa's *The Yellow Shark* album, the strings and winds sound delicious, but the percussion lacks sparkle. The Audeze EL8 open-back headphone restores the percussion's leading-edge transients, and the soundstage opened up. While that's great, I missed the NightHawk's more natural tonality. I like both headphones for different reasons; there's no clear winner here.

Still, with recordings from sessions I attended, like David Chesky's *Jazz in the New Harmonic*, the EL8 did a better job re-creating the sound as I remember it. The low-level detail and room acoustics came through better on the EL8, but at the same time, I preferred the NightHawk's more satisfying tonality with piano, bass, trumpet, and tenor sax. With singers like Ella Fitzgerald, Beyoncé, and Frank Sinatra, you really hear the way they *inhabit* a tune, bringing out the meaning of the lyrics and their emotions. I love the way the

#### RATING

##### AudioQuest NightHawk Headphone

Performance ★★★★★  
Build Quality ★★★★★  
Comfort ★★★★★  
Value ★★★★★

#### THE VERDICT

**NightHawk's use of sustainable materials, high comfort, and sweet sound bode well for AudioQuest's debut headphone.**



NightHawk keys into their phrasing and breath control. That's what separates the best singers from merely competent ones, and the NightHawk brings it out.

Late in the review process, AudioQuest sent a preproduction sample of the NightHawk balanced headphone cable (with a four-pin XLR connector; other balanced connector types will also be offered). I switched between the standard and balanced cables plugged into my Oppo HA-1 headphone amp, and I found the sound with the balanced cable to have a clearer overall presentation and a slightly wider soundstage. If you have a balanced amp, definitely opt for the balanced cable.

The NightHawk is the very first AudioQuest headphone. More are in the works, and they're all being designed by Skylar Gray. What can I say? He's off to a great start!



#### SPECS

**Type:** Semi-open, over-the-ear • **Driver Type/Size:** Biocellulose/50mm • **Impedance:** 25 Ohms • **Sensitivity:** 100 dB/1mW • **Weight (Ounces):** 12.2







## Digital Transition



I have two preschool-aged kids who use my CDs and DVDs as Frisbees and coasters. For that reason

alone, I feel a need to make a transition from physical media to computer-based playback. I bought an AppleTV so the kids could watch cartoons on Netflix, which solved some issues. When I used AirPlay to stream music to the Apple TV from my computer and tablet, however, I wasn't impressed by the sound quality.

A salesperson recently demonstrated a new A/V receiver for me by playing music files on a flash drive plugged into its USB input. I found the sound to be surprisingly decent. Here's my question: Should I retire my circa-1998 Acurus Act 3 preamp and buy a new model with HDMI/USB inputs, or should I spend a few hundred dollars on an add-on solution for my PC and get more mileage out of my current system? I have an unused Dell Vostro 230 computer with a 240-GB SSD drive and a 3-TB backup that I can co-opt for that purpose.

Paul Erickson / Via e-mail

A key benefit of computer-based audio is that it doesn't cost an arm and a leg to put together a great-sounding system. You already have the computer—with a high-capacity SSD drive, no less—and A/V electronics (preamp and amp). The only thing you need to add is a USB digital-to-analog

dollars, you'll find the Meridian Director (\$699), a model that *Sound & Vision's* reviewer called "The best USB DAC we've heard yet."

In addition to converting digital signals, these DACs also provide asynchronous data transfer, a feature that lets the DAC control the clock rate at which digital data is converted to analog audio. This can have an audible impact by eliminating the timing errors that get generated when your PC's sound card performs digital-to-analog conversion, or when you use an optical/coaxial digital or HDMI connection to convey audio data to an external receiver or preamp (HDMI connections in particular are prone to timing errors, or "jitter").

Since you're concerned with sound quality (FYI, you aren't the first reader to complain about the AppleTV's audio), an additional step you'll want to take is to rip CDs in either WAV or AIFF format, or in one like FLAC or ALAC that provides lossless compression. The default format for iTunes is AAC, which provides a variable compression range maxing out at 320 Kbps. Lossless formats, in contrast, convey audio data at a 1,411-Kbps bitrate.

Yet another benefit that USB DACs provide is the ability to decode "master-quality" Hi-Res Audio downloads from sites like HDtracks, Acoustic Sounds, and Pono. Apple's iTunes is finicky about handling high-res (you'll need to change the sample rate in the iTunes audio control panel from its default setting each time you switch between playing regular and high-res tracks), though there are plenty of third-party software options such as Audirvana+ (\$49), and BitPerfect (\$10) that provide a workaround for that issue.

You also mention that your DVD collection is in jeopardy. DVDs, too, can be ripped to your computer's hard drive for playback using free software utilities like Handbrake (Windows/OS X). It's possible that your computer already has the proper connections to output a digital audio bitstream. If not, you may have to buy an add-on sound card to get multichannel surround from your PC to your preamp (the USB DACs described above aren't capable of decoding or passing through Dolby Digital or DTS bitstreams). Fortunately, a Google search will turn up plenty of under-\$50 sound cards from companies like Asus and Creative that can transform your PC into a home theater audio source.

**It doesn't cost an arm and a leg to put together a great-sounding computer-based audio system.**

converter to take the digital audio data coming from your PC's USB port and convert it to an analog stereo format your current preamp can handle.

There are plenty of affordable USB DACs out there you can buy for this purpose. A few that *Sound & Vision* has tested and endorse include the AudioQuest DragonFly (\$150), Audioengine D3 (\$189), and Cambridge Audio DacMagic (\$189). Stepping up beyond a few hundred

## TiVo Bolt Zaps Ads

TiVo's new Bolt is the company's first Ultra HD DVR. But what will probably get the attention of the TV networks is the remote control's SkipMode button, which zaps TV commercials before they rot your brain.

The Bolt will thus become the bane of the TV networks, who have been fighting ad-skipping technologies since the VCR era. That included a recent court fight against the AutoHop feature in Dish Network's Hopper DVR. TiVo is limiting SkipMode to programming from 4 p.m. to midnight and disabling it for sports and local programming. And you have to mark which programs should be recorded with skipped ads in the program guide. Whether those measures will be enough to mollify the networks and their attorneys remains to be seen.

The Bolt also has a QuickMode that speeds up recorded material by 30 percent with pitch-corrected audio, so you can cut to the chase without enduring chipmunk voices. OnePass searches programming across platforms including broadcast, cable, video on demand, and streaming. The Share with Friends feature facilitates social viewing via Facebook, Twitter, et al.

Apps shipping with the unit include Netflix, Amazon Prime, Vudu, YouTube, Spotify, Pandora, MLB, and iHeartRadio. Hulu is missing from the list; presumably more are to come. The Bolt will support AirPlay through the iOS app, and TiVo says an app for Amazon Fire TV is in development.

With its melted rectangular solid form, the Bolt looks like a DVR reimagined by Salvador Dalí. It has four tuners, is replacing the similarly equipped Roamio-S, and limits video output to HDMI, eliminating analog



video outs. The HDMI version is 2.0a, with HDR support, and HDCP anti-copy technology is version 2.2, ensuring access to UHD programming. A remote-finder button on the back panel helps when you misplace the remote control. The Bolt sells for \$299 with 500 GB of storage or \$399 with a full terabyte. Both include the first year of program guide service.—MF



By Steve Guttenberg

### RATING

**EnigmAcoustics Dharma D1000 Headphone**

Performance ★★★★★  
Build Quality ★★★★★  
Comfort ★★★★★  
Value ★★★★★

# The Combination of the Two

**PRICE \$1,190**

**EVEN THOUGH** I WAS HEARING good reports from friends about the EnigmAcoustics Dharma D1000 hybrid electrostatic/dynamic headphone, I was still more than a bit skeptical about how successful the blending of its two drivers could be. AKG made hybrid dynamic/electrostatic headphones in the late 1970s. I auditioned a pair just a few years ago and heard the electrostatic tweeter and dynamic driver as two separate sound sources.

Thankfully, the Dharma D1000 aced the blend—the two drivers sound like one.

More good news: EnigmAcoustics' SBESL (Self-Biased Electrostatic) technology eliminates the need for an AC power connection to

### AT A GLANCE

**+** Plus

- Hybrid dynamic/electrostatic design
- Brilliant high-resolution sound!
- Wide open imaging

**−** Minus

- The relatively stiff cable is kinky

provide a polarizing voltage for the tweeter, so you can plug the Dharma D1000 into any standard ¼ inch (6.3mm) headphone jack. The headphone's 52mm Washi paper driver seamlessly transitions to the electrostatic tweeter with

a phase-coherent (first-order) crossover at 10 kilohertz.

It's a big headphone, but it feels fairly light. The Dharma D1000's round ear pads are nicely cushioned, and build quality standards are fully commensurate with the Dharma D1000's high-end aspirations. The 10-foot-long, user-replaceable cable is fairly stiff and prone to kink, but it uses secure-fitting ear-cup plug connectors. I listened with a few different headphone amps at home, namely the Oppo HA-1, Burson Audio HA-160, and the little Apogee Groove, and preferred the last two amps. Dharma D1000 sounded substantially *different* with each amp: The HA-1 was too lean, while the HA-160 was best. The Groove was also sweet; it did a nice job filling out the midrange.

Listening to Simon & Garfunkel's *Live 1969* CD with the HA-160 and the Dharma D1000 was a mind-altering experience. The music may have been recorded live 46 years ago, but it feels like it's alive, right now. The voices and Simon's guitar are right *there*, with nothing added or taken away. That's what a great headphone can do: provide a far more direct portal to the sound of a recording than speakers ever can. Speakers are, after all, *always* heard within and colored by the acoustics of the room. With the best headphones, nothing stands between your ears and the music.

I brought the Dharma D1000 to a Chesky Records session where I listened to Noah Wall and the New Appalachians sing live, then rushed back to the control room and hear the band over the headphones. The virtual reality aspects of the sound, even by high-end standards, were thrilling. The match was awfully close, though I did feel the Dharma D1000 made Wall's voice sound tonally lighter, with less body than she really has. The Audeze LCD X headphones were better in that regard—they had a less prominent, sweeter treble—but the Dharma

### THE VERDICT

**The EnigmAcoustics Dharma D1000** seamlessly melds dynamic and electrostatic drivers to produce ultra high-resolution sound.

D1000 pulled ahead in terms of putting me in the room with the band. The stand-up bass "pluck" and woody tone was more fully developed, and the "spaces" between the instruments were more clearly defined over the Dharma D1000. Once you experience that wide-open yet sharply focused soundstage, other headphones sound rather small and narrow.

The Dharma D1000 will delight audiophiles seeking high-resolution sound, but its extraordinary detail also highlights recording flaws and harshness. Too much information might be an issue, depending on the sort of music you play. I would not recommend the Dharma D1000 to anyone looking for a headphone that makes everything sound great; if you're after something more forgiving, the Audeze LCD 3 would be a better choice. That said, Audeze headphones fall short of the ultimate resolution provided by the Dharma D1000.

EnigmAcoustics' matching Athena A1 hybrid tube/solid-state headphone amplifier wasn't yet available when this review was underway, but I imagine it's going to be sweet with the Dharma D1000. Let the good times roll!

### SPECS

**Type:** Open, over-the-ear • **Drivers:** 52mm Washi paper driver/electrostatic tweeter • **Impedance:** 26 Ohms • **Sensitivity:** 103 dB/1Vrms • **Weight (Ounces):** 15.8





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worth it."



## The Greatest Analog Audio Playback Machine Ever Invented



A couple of days ago, I was sitting in my home theater listening to some music—a recording of Beethoven's 6th

Symphony, actually—and it hit me: The symphony orchestra is the greatest analog audio playback machine ever invented.

Consider: On stage are 100 men and women who have studied all their lives to function as human music playback devices. Long ago, they surpassed mere technical proficiency and now have mastered the rare ability to express emotion through a mechanical device. Much more difficult, I think, than using the voice. They vibrate columns of air, taut strings, stretched membranes, and pieces of metal. Musically speaking, that includes violins, violas, flutes, bassoons, trumpets, French horns, tympani, cymbals, and all the instruments of the modern orchestra.

Those complex activities are programmed by a marvelous kind of input data: the composer's score. Pages and pages of strange symbols, as unintelligible as

**An orchestra is a collection of 100 digital-to-analog converters.**

computer code to a layperson, inform each musician on how to operate the instrument. The discrete symbols on the pages, while certainly not expressed as binary digits, are surely more digital than analog. Thus I like to think of the orchestra as a collection of 100 digital-to-analog converters inputting digital data and outputting analog waveforms.

From a technical standpoint, electronic D/A converters are light-years beyond simple keys and strings, fingers and breathing. But unlike those mere pieces of silicon, these organic converters intelligently decipher those input instructions, call upon enormous stores of muscle memory, and do something that silicon cannot do: add indefinable artistic instinct. The concert hall, a kind of spe-

cially designed instrument in its own right, sums those hundred waveforms and imposes its own set of acoustical characteristics. Finally, that sound reaches my ears. Wow. Just wonderful.

The virtuosity of the musicians goes far beyond their solo skills; each player must work in concert with 99 other players in perfect harmony. Can you name any other human ensemble, with that number of people, that can operate with such unanimity? In the course of an evening's performance, they produce hundreds of thousands of events (notes) that merge with precision to create an incredible whole. Of course, the conductor is literally the machine's central processing unit, exerting control over every part of the orchestra, and bending the many visions of the individual players to the conductor's single vision. Can you name another leadership position that can so supremely exert its power over a group or, for that matter, can you name another group that so willingly subjugates its individual preferences to a leader?

The many players in a fine orchestra operate like a living machine. On that Beethoven recording, I can clearly hear the woodwind players quickly inhaling before a demanding section, and the double bass players discreetly shuffling their feet, bracing their bodies before they attack a forte. I can even hear the conductor's gasping exclamations as he exhorts the players to greater effect. A world-class orchestra, under the baton of a skilled conductor, is surely one of the noblest of human creations, and I say this with sincere and unbridled admiration for all classical musicians.

After working at a university school of music for many years, my one regret is that I never had the opportunity to stand in front of the orchestra and, however ineffectively, wave my arms as music unspooled from the greatest analog music machine ever invented. My only other regret is that I have not yet played the role of engineer in the second greatest analog machine, a stream train locomotive. But that's a story for another day and, I suspect, a whole different magazine.



## AT&T Exploits DirecTV Link

Barely a week after the FCC approved its merger with DirecTV, AT&T lost no time in offering new bundles exploiting the new entity's many talents. "We're going to deliver more TV and entertainment choices to more screens—when and where our customers want it," said an executive.

Four packages ranging from \$50 to \$125/month offer various levels of DirecTV satellite service or, where available, AT&T U-verse TV, which combines a fiberoptic network with last-mile copper wiring. Perhaps the biggest deal is a \$200/month bundle combining DirecTV or U-verse HD and DVR service for up to four TVs with unlimited talk and text and 10 GB of sharable data for four cellular lines.

AT&T is bucking the cord-cutting tide with these new offerings. However, even before the merger was announced, AT&T announced that it lost just 22,000 U-verse TV subscribers in the second quarter of this year compared to 190,000 at the same time last year. That is certainly a good omen. It leaves nearly six million U.S. TV subscribers—and the acquisition of DirecTV adds another 20.4 million.

Over on the DirecTV side, the satellite operator has begun offering a new set-top box that connects wirelessly to the Ultra HD-capable Genie DVR, extending the Genie's reach to additional rooms and screens. The Genie Mini box supports Dolby Digital Plus surround sound.—MF



## Lenovo Bows Atmos Tablet

Would a tablet computer benefit from height-enhanced Dolby Atmos surround sound? Lenovo customers are about to find out with a new series of Yoga Tab 3 models. Technically, what they offer is "virtual Atmos." The top model, a 10.1-inch Android 5.0 tablet (\$499), also boasts a 70-inch video projector that rotates 180 degrees. It delivers "virtual Atmos" through four built-in JBL speakers as well as through headphones. Two other Yoga Tab 3s, with 10-inch (\$199) and 8-inch (\$169)

screens, deliver Atmos through headphones only.—MF





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## Sennheiser RS 185 Headphone

By Steve Guttenberg

# Wireless Roaming

**PRICE \$400**

I'VE AUDITIONED A NUMBER OF wireless Sennheiser models over the years and was always satisfied with the sound. Sennheiser claims their latest 'phones are better than ever, and the RS 185 is the best sounding of the twelve wireless models the company currently offers. No other brand has as broad a range of wireless headphones, starting with the \$99 Sennheiser RS 120.

The RS 185 boasts a new lossless 2.4-gigahertz wireless transmission system developed in conjunction with Texas Instruments. One new feature I really appreciate is that when you turn on the RS 185 headset, the transmitter/charger base automatically wakes up and is ready for action (with the older models you had to turn them on separately). The transmitter has optical

### AT A GLANCE

#### + Plus

- New lossless wireless audio technology
- Two-year warranty
- Lightweight design

#### - Minus

- Wireless 'phones can't play loud

digital and stereo RCA analog inputs (one each). You can play two pairs of headphones from a single transmitter (the HDR 185 headphone sells separately for \$200).

Sennheiser claims a 328-foot line-of-sight range for the RS 185 system; walls and other

obstacles between the transmitter and 'phones reduce the useable range. Even so, everywhere in my 1,000-square-foot Brooklyn apartment, and up to 35 feet out into the building's hallway, the sound never faltered. Beyond that, the sound cuts out—but no other wireless headphone has performed as well in my space. Maximum playtime is 18 hours.

In daily use, the RS 185's performed admirably. Older wireless headphones sometimes hissed, sputtered, fizzed, distorted, and dropped out from time to time. Bass oomph and dynamic range were in short supply. The RS 185 largely avoids those pitfalls, and it's worth noting that its 32mm drivers share DNA with the drivers in Sennheiser's legendary HD-650 wired headphones.

I watched a bunch of movies with the RS 185 and found a lot to like. First, the headphone felt light on my head, though ear pad pressure was just a tad high. The upside is that the RS 185s stay put even when you move around. I was taken with Noah Baumbach's quirky little indie film *Frances Ha*. It felt a bit like HBO's *Girls*, but Frances (Greta Gerwig), stuck with a bad case of twenty-something doldrums in NYC, really caught my fancy. The acoustics of tiny NYC apartments, noisy clubs, and bustling street scenes sounded spot-on to me, a lifelong New Yorker. In mid-movie I switched over to the Sennheiser Momentum 2.0 over-the-ear headphones to see how the RS 185 compared with a wired Sennheiser, and it was no contest. The closed-back Momentum 2.0 definitely sounded closed-in, the open-back RS 185 far more spacious. Momentum has more midrange presence and a livelier sound, but I preferred the smoother RS 185.

To test the RS 185's dynamic punch, I popped on jazz drummer Peter Erskine's *Old School* album. The RS 185 had a fuller, more potent sound. They were close in terms of

### RATING

**Sennheiser RS 185 Headphone**

Performance ★★★★★

Build Quality ★★★★★

Comfort ★★★★★

Value ★★★★★



### THE VERDICT

**The Sennheiser RS 185** raises the bar on audiophile-grade wireless headphone sound quality.

dynamic punch, but I'd give the nod to the Momentum. Since the Momentum was plugged into an NAD C 316BEE integrated amplifier, it could play a lot louder than the battery-powered RS 185 (it has a 1.2 volt AAA in each ear cup). Don't get me wrong here, the RS 185 can rock, but it's a matter of degree. If you want to feel the power of full-throttle assaults with films like *Mad Max: Fury Road* on Blu-ray, the RS 185 won't thrash your ears the way the Momentum, or most wired full-size headphones can.

The bottom line for me is this: How close can the sound of a wireless headphone come to that of a wired headphone costing around the same dollars? By that score, the Sennheiser RS 185 does very well indeed.

### SPECS

**Type:** Wireless, open, circumaural • **Driver Size:** 32mm • **Weight (Ounces):** 10.9



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## Get Thee to the Abbey



Back in 2001 when the M.I.T. Media Lab unveiled a demo about social media and TV, it presaged greater things to come. At the bottom of the TV screen, viewers' live comments appeared for all to see, demonstrating the potential of instant feedback shareable by everyone. My eyes opened wide as I experienced the idea of social media at a time when tweets were still for the birds and Facebook wouldn't launch for another three years.

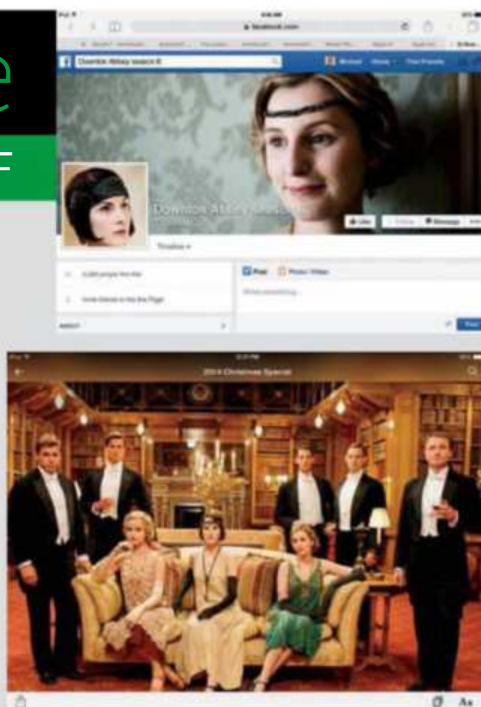
You can be sure that when the final season of *Downton Abbey* begins its run on PBS on January 3, social media will be out in force. What the Media Lab didn't know 15 years ago was that second screens—wireless handheld phones and tablets—would preclude the need for stealing TV screen real estate for chatting. Communicating with fellow fans feels so much cozier on a screen held close while curled up on the couch in front of the big TV.

The second screen is also being deployed to help viewers keep track of the

**Communicating with fellow fans feels so much cozier on a second screen.**

enormous cast. With 15 characters deceased by the end of Season 5 (be it by suffering a heart attack while engaged in sex or going down on the *Titanic*), we've seen more crucial characters killed off in *Downton Abbey* than in 11 seasons of *Grey's Anatomy*. Considering that we're now about to begin the sixth season of a weekly series that each year runs its course by the spring thaw, a memory-jogging tool is essential. Enter the apps.

Several encyclopedic and quote-filled apps are available for purchase for your iOS or Android device. But keep your money. I've found that the free apps are more comprehensive and up to date. Also, using a search engine in your browser can pretty much get you answers to everything you need. YouTube alone is a treasure-trove of both video clips and some complete episodes.



I recommend the Wikia Fan App for *Downton Abbey*, which describes itself as "created by fans, for fans." Sure enough, the app leaves little out. Curious about Tom Branson's back story or why Bates uses a cane? You'll find the information here.

The app even came in handy while watching *The Good Wife*, in which the face of one of the CBS drama's regulars looked familiar. After scrolling through 194 head shots of *Downton Abbey* characters, I finally found a match at the 194th picture tile captioned "Henry Talbot." So I dove deeper to learn that the character had caught the eye of Lady Mary at the manor's 1924 Christmas party. Played by the English actor, Matthew Goode, would Talbot be returning in Season 6 to win Mary's heart? I didn't want to know—not yet.

As I write this column in the fall, *Downton*'s final season has already begun to air in Great Britain, which is just milliseconds away by fiber. Spoilers haven't been this big a threat to the Colonies since limes rotted on tall ships. A colleague admitted to me that he always watches the show when the Brits see it thanks to a friend of his wife's who lives in England. Mum's the word, he promised. I'm holding my breath.

When it comes to the manners of Americans watching *Downton Abbey*, both unscrupulous streaming and pirated discs should be avoided. I'd rather laugh or cry in sync with my own countrymen than get an advance screening. After all, what fun is social media if we can't be surprised together?

As Violet Crawley, Dowager Countess of Grantham (Maggie Smith), remarked: "First electricity, now telephones. Sometimes I feel as if I were living in an H.G. Wells novel."

## LG Knows Its ABCs

We've got a lot of LG-related news this month. And what an alphabet soup it is: OLED, UHD, HDR. What it boils down to is a two-pronged attack to market next-generation TVs and animate them with the software they need to look their best.

LG is a big proponent of OLED (organic light emitting diode) TVs, which are being positioned as the videophile-favored successor to plasma. OLED has the potential to look better than the LCD sets that have almost entirely taken over the market. One of its strengths is black-level reproduction. Add HDR (high dynamic range) technology—which offers further improvements in contrast as well as more accurate color—and you've got a powerful combination.

LG's first HDR OLED UHDTVs (remember, we promised you alphabet soup) are the 65-inch 65EF9500 (\$7,000) and 55-inch 55EF9500 (\$5,500). Built-in audio guts by Harman/Kardon sweeten the deal.

LG is bullish on OLED in general. At a European trade show, CEO Brian Kwon said the company would sell five times as many OLEDs in the second half of this year as it sold in the first half. At the January 2015 Consumer Electronics Show, the company said it expected unit sales to rise to 1.5 million in 2016. DisplaySearch estimates that 400,000 OLED TVs will be sold this year, with the market rising to seven million units by 2019.

One potential advantage of OLED is that displays can be made thin and flexible enough to be rolled up and carried in a tube. The *Korea Times* quoted an LG researcher as saying that a 55-inch rollable prototype will be shown at the 2016 Consumer Electronics Show. Making big-screen OLED portable may prove to be a powerful (and creatively disruptive) idea.

HDR requires both hardware and software to work its picture-quality magic, and LG is looking for ways to get compatible programming into its sets. Amazon's HDR streaming is coming to LG's 2015 OLED UHD sets.

With or without HDR, UHD sets need UHD programming. DirecTV's Ultra HD



service is getting a leg up with LG's support for UHD satellite streaming in select 2014 and 2015 TVs without need for a box, though you'll need the Genie DVR for recording. DirecTV's Genie already supplies UHD to Samsung TVs and plans to add support for Sony TVs. —MF

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# Reference Tracks

MIKE METTLER

## Tony Banks Reveals the Genesis of His Love for Surround Sound

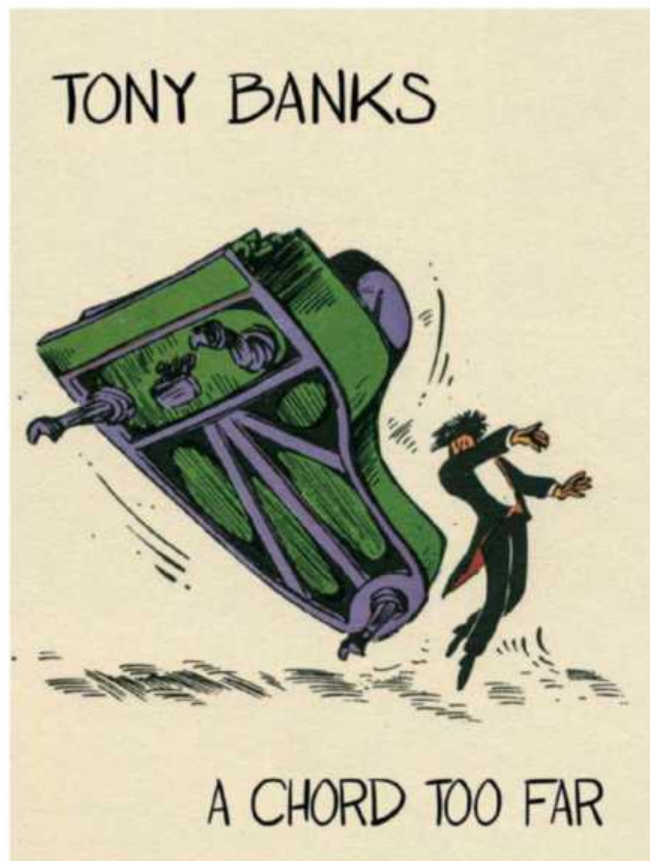


In a band of equals, some can appear to be more equal than others.

"I always like to have the first word and the last word on albums," laughs keyboardist Tony Banks, one of the main songwriters in Genesis. Banks has always felt making an impression right as a song commences to be paramount. "You make an impact with those first few bars. It sets you up for the next 5 minutes, so you ought to try and get it right," he says.

Besides his storied career in Genesis, Banks also tried his hand at a solo career, the highlights of which have been compiled in the four-disc box set *A Chord Too Far* (Esoteric Recordings). "There are many moments on there I think would be nice for those people who crave the early Genesis period to hear," he says. Among the highlights: the grand, sweeping instrumental "From the Undertow," the Banks-sung "At the Edge of Night," Nik Kershaw crooning the political blues on "Red Day on Blue Street," and the 17-minute tour de force, "An Island in the Darkness"—a lost Genesis track if ever there was one—which also features a fine lead vocal from Wang Chung's Jack Hues and a lengthy, blazing guitar solo from longtime Genesis touring guitarist Daryl Stuermer.

While Banks puts the future of his longtime band to rest—"the chance of Genesis getting back together again is pretty slim, I have to say"—we have plenty of *Chord* music to sink our collective ears into. (The keyboardist confirms quite a few tracks on the box set have also been mixed in 5.1 "for possible future projects.") Banks, 65, called from across the Pond to discuss the, er, genesis of his deep love for surround sound and how to combat



the ills of compression. As Bank-statements go, this one is rich in high-fidelity rewards.

**MM:** I've always liked your sense of adventurousness as a composer, and I think that carried over with what you did on your first solo album, *A Curious Feeling* (1979). That one's a particular favorite of mine, especially the surround-sound mix you and Nick Davis did of it on DVD [in the two-disc 2009 deluxe edition].

**TB:** Oh, right, great. We were pleased with that. We felt the surround-sound remixes did make it sound a lot better, so it was fun to do. When we did the Genesis stuff in 5.1, my favorite moments were in the first half of "The Cinema Show" [from 1973's *Selling England by the*

*Pound*], where you have all of these guitars that you could just place all around you—a wonderful sound effect.

There's just something about the way you can space everything out and actually hear everything in 5.1, all sorts of little bits and pieces that you're able to find—and find room for them there in a way as well. Whereas in the old days, you had to live with it if something got stuck behind something else in a mix. You never really heard it, and now if you wanted to hear, say, a guitar part or something, you finally could.

**MM:** Speaking of "The Cinema Show," *Selling England by the Pound* is available in surround on High Fidelity Pure Audio



Blu-ray, which is quite the listening experience. It was so compressed in the vinyl days, and this is one mix that seems to have been opened up a lot more in its higher-res form.

**TB:** Well, you can do so much more with it now. When we used to do LPs, they were always over-length anyhow, so that meant everything had to be very compressed. Hopefully, that was improved when it came out on CD. But when we went back to do the remixes a few years ago, I felt the stereos were much better. When we got to the 5.1, we had the ability to position everything in a way where I think Genesis music benefits.

**MM:** In the early part of the Genesis catalog, the 5.1 remix of a song like "Supper's Ready" [from 1972's *Foxtrot*] really brings out what you could do as a band, and it really captures the track's overall compositional excellence.

**TB:** Well, I think so. We spent a lot of time on it, really. And it's a longish song, so it shows what you can do. It's such a wonderful way to experience it, as you can immerse yourself in it much more in 5.1 than you can with the stereo.

*An extended version of the Mettler-Banks Chord Q&A appears in The S&V Interview blog on soundandvision.com.*

### CD

**LABEL:** Esoteric Recordings

**AUDIO FORMAT:** 44.1-kHz/16-bit PCM stereo

**NUMBER OF TRACKS:** 48 on four discs

**LENGTH:** 4:35:31

**PRODUCERS:** Tony Banks, Nick Davis, David Hentschel, Stephen Short, Steve Hillage, John Eden, Richard James Burgess

**ENGINEERS:** Nick Davis, David Bascombe, David Hentschel, Steve Chase, John Gallen







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# NewGear

THIS MONTH'S HOT STUFF...

## ➔ Elite Vmax Dual Series Two-in-One Projection Screen

Call it a stroke of genius, but the Vmax Dual Series electric projection screen alternates between 16:9 and 2.35:1 aspect ratios, making it a cinch to switch from a screen optimized for TV to one ready for ultra-wide blockbuster action. All you have to do is tap a button on the supplied RF (radio frequency) remote. A 12-volt trigger lets you synchronize the screen with the projector so it drops or lifts when power is turned on/off.

**Simple Setup:** Available in a variety of sizes, the two-in-one screen comes fully assembled and includes brackets for mounting on the wall or ceiling. MaxWhite 1.1 gain material is standard, or you can opt for Elite's CineWhite tab-tensioned screen; both are "black-backed" to eliminate light penetration. Prices start at \$859.

**Elite • (562) 483-8198 • elitescreens.com**



## ✦ Bluesound Pulse Flex Wireless Speaker

The Pulse Flex is the latest and least expensive addition to Bluesound's recently updated Wi-Fi-based wireless audio system. The two-way speaker supports aptX Bluetooth streaming, boasts a 192-kHz/32-bit DAC, has five assignable presets for storing favorite Internet radio stations, streaming channels, or playlists from your personal library, and can be controlled via the BluOS app. **Flex for Flexible:** The speaker's small size (it's 7 inches tall) and beveled enclosure allow it to be positioned vertically, horizontally (upright or tilted back), or mounted in a corner. It even has a built-in alarm clock, making it perfect for night stand duty, and Bluesound offers an optional battery pack if you want to go portable. We have yet to hear Flex, but good sound is a safe bet: It was designed by PSB's Paul Barton. **Price:** \$299  
**Bluesound • bluesound.com**







### ➔ Ceratec Effect Wall Speakers

No floor or shelf space for speakers? No problem. The elegant Effect speakers from Germany's Ceratec are designed to be mounted on the wall and come in four sizes: the 47-inch Maxi W (\$1,599/pair), 27-inch W (\$650 each), 10-inch W Mini (\$899/pair), and 5-inch W Micro (\$599/pair); all are a svelte 5 inches wide and 6 inches deep. **Décor Friendly:** Silver is standard, but other finish options—including black, gold, white, or any RAL color—are available at extra cost. All models feature an extruded-aluminum enclosure with an integral mounting bracket that swivels 30 degrees in either direction from its axis point and a 0.5-inch MDF baffle coated with acoustic foam to dampen reflections that can color the sound. Prices include free shipping.

**Essence • (727) 580-4393 • essence-electrostatic.com**



### ➔ Marantz AV7702 mkII Preamp/Processor

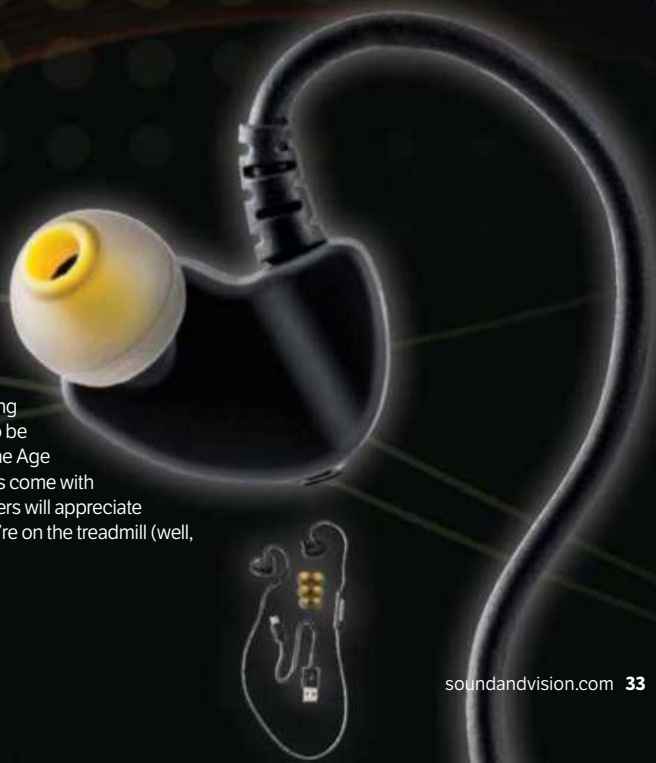
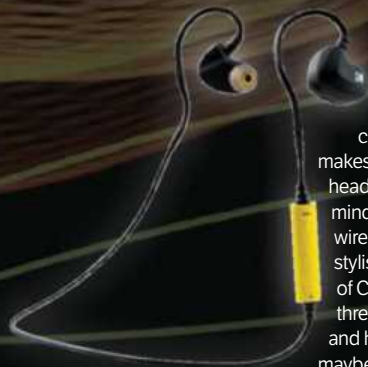
The new and improved mkII version of the Marantz AV7702 brings high dynamic range (HDR) and Rec. 2020 color space compatibility into the fold along with support for the new HDMI 2.0a spec and HDCP 2.2 copy protection, which you'll need to stream 4K/Ultra HD content. The ISF-certified pre/pro can be configured for 11.2- (XLR) or 13.2- (RCA) channel action, has eight HDMI inputs (one on the front panel), and can be controlled from your smartphone using the Marantz Remote App. **Surround Galore:** Carryover features include Dolby Atmos surround processing and onboard Wi-Fi and Bluetooth. Want more state-of-the-art surround options? DTS:X will be available via a future firmware update, and you can upgrade to Auro-3D with its 10.1-channel Automatic upmixer for an extra 200 bucks. **Price:** \$2,199

**Marantz • (201) 762-6500 • marantz.com**

### ➔ Kicker EB300 Water-Resistant Bluetooth Earbuds

You probably know Kicker for its... uh... kick-ass car stereo gear, but did you know the company also makes Bluetooth speakers (who doesn't?) and headphones (ditto)? Designed with active lifestyles in mind, the EB300 earbuds distinguish themselves by being wireless *and* sweat/water-resistant. They also happen to be stylish (never underestimate the importance of style in the Age of Celebrity-Endorsed Deadphones). **Sure Fit:** The buds come with three different size silicone tips to ensure a snug fit joggers will appreciate and have an in-line microphone for taking calls while you're on the treadmill (well, maybe not). Battery life is rated at 8 hours. **Price:** \$99

**Kicker • (405) 624-8510 • kicker.com**





● Curved screens, like this one on Samsung's JS9500 series, don't really do much for viewing.



# The New TV Tech

What you need to know before buying an HDTV this season. By Al Griffin



TV shopping has become vastly more complicated over the past decade. Buyer confusion used to revolve around issues of 720p

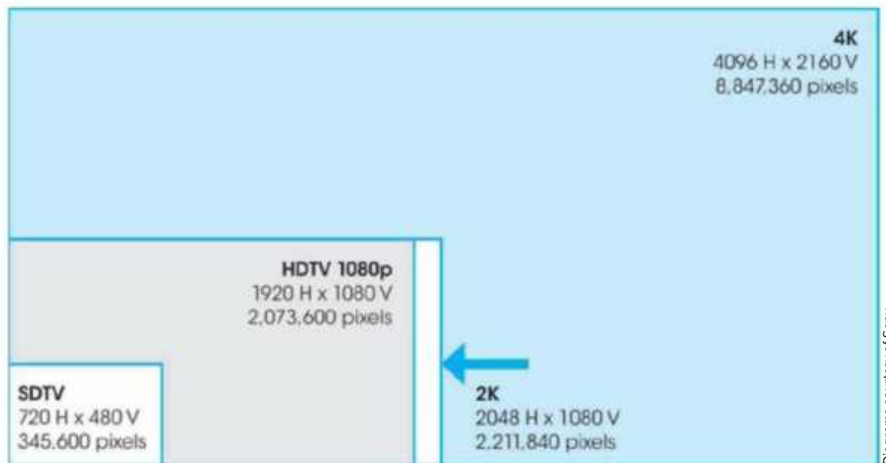
versus 1080p, LCD versus plasma, edge-lit versus full-array, 3D or not 3D, and "What's a smart TV?" All manageable problems, in retrospect.

The arrival of 4K/Ultra HDTV has introduced a whole new set of complications for shoppers to confront before they take the plunge. Many of the sets we've seen in 2015 sport curved screens, emerging display technologies, and the capabilities to handle the growing range of UHDTV sources, whether streamed or stored on forthcoming physical media. And those sources themselves sport a range of advanced features, not all of which can be handled by even the latest TVs.

Confused? Frightened? Put off? Don't be. All you need to know can be broken down into a few key areas, which I will lay out for you below in detail. The truth is, no matter what their capabilities are, all the high-end UHDTVs that have come out in the past year will be backward-compatible with your existing gear (Blu-ray player, cable/satellite DVR, streamers, etc.). That said, having an understanding of what's new, and what each feature brings to the table, will help you make a sound decision about which set to invest in.

## Thrown a Curve

One recent, dramatic change in TVs is the use of a curved screen, as seen in lineups from, primarily, Samsung and LG. Buyers walking into a store and



● This diagram shows the relative differences in pixel density among picture formats. Not shown is 3840 x 2160 UltraHD, which falls just short horizontally of the full DCI 4K projection standard. Most new 4K content released for home viewing will be UltraHD to match the new displays.

coming across curved screens among the rows of flat-screen models are bound to wonder, "Are curved sets better?"

The answer: No. Curved screens are part marketing gimmick pushed by TV makers to allow certain sets to stand out from the crowd, part one-upmanship between those two Korean companies. Not only will a curved screen do (essentially) nothing to improve picture quality, but it usually comes at a price premium over regular flat-screen models.

The main point that both Samsung and LG make in defense of the curve is that it creates a more immersive, cinematic viewing experience. There's some legitimacy to that argument, but when a 55- or 65-inch curved screen (the most common) is viewed at a typical 8-to-9-foot seating distance, any potential for visual immersion disappears because the screen's left and right edges fall way short of extending into your peripheral vision, as they would at a movie theater. The only current models with



any potential to create an immersive experience are Samsung's 88-inch and LG's 105-inch curved-screen LCD Ultra HDTVs, and those cost \$20,000 and \$100,000, respectively.

Along with stirring up consumer confusion, curved TVs can actually degrade picture quality. The main problem: A slight bowed effect appears at the top and bottom of the picture when you watch ultra-wide letterboxed movies. Also, off-axis picture uniformity with LCD models can be worse than it would be with a flat-screen model, possibly resulting in heightened black levels and faded colors. They might also produce exaggerated reflections from room lights, depending on where you're sitting. Meanwhile, curved screens are awkward (though not impossible) to mount on a wall. Bottom line: If the cosmetics of a curved panel speak to you, by all means, have at it. But don't buy into the hype that it'll do anything for image quality.

### 4K/Ultra HDTV

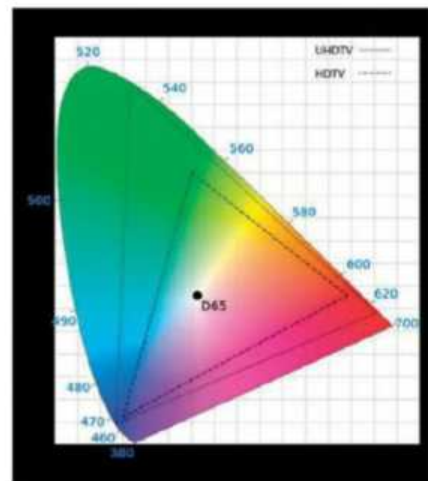
When you're shopping for a new set today, perhaps the biggest decision you'll have to make is whether to buy a regular HDTV or an Ultra HDTV. The most basic difference between the two is resolution: Whereas HDTV screens contain 1920 horizontal x 1080 vertical pixels, UHDTVs have a pixel grid that's 3840 x 2160. That's more than 8 million pixels—four times as many as with regular HDTVs. While those specs might seem impressive, in most cases, all those extra pixels don't

have a huge impact. Why? Blame the human visual system, which lacks sufficient processing power to let the eye distinguish UHDTV's added detail at typical screen sizes (50 to 65 inches) viewed at typical seating distances. Where UHDTVs can have greater impact—and a rather dramatic one, at that—is in their ability to display images with a wider color gamut and High dynamic range (HDR). Let's cover each one separately.

### More, Better Color

The current HDTV system (broadcasts, Blu-ray, streamed video) uses the Rec. 709 color space. Actually, your eyes are capable of taking in a much wider range of color than Rec. 709 offers, which is why the color gamut for Ultra HDTV has been expanded to allow for the much wider P3 color space used for theatrical digital cinema. You'll also likely hear or read about an even wider color space, ITU (or Rec.) 2020, discussed in conjunction with Ultra HD's capabilities. But no consumer set we know of can currently display it, so don't expect to see it in UHD sources any time soon.

Along with the size of the color space, which defines how wide the range of color goes, another critical specification for color is the bit depth. This determines how finely the TV can sparse the colors to make individual hues; more bits means finer gradations of color, which helps minimize the

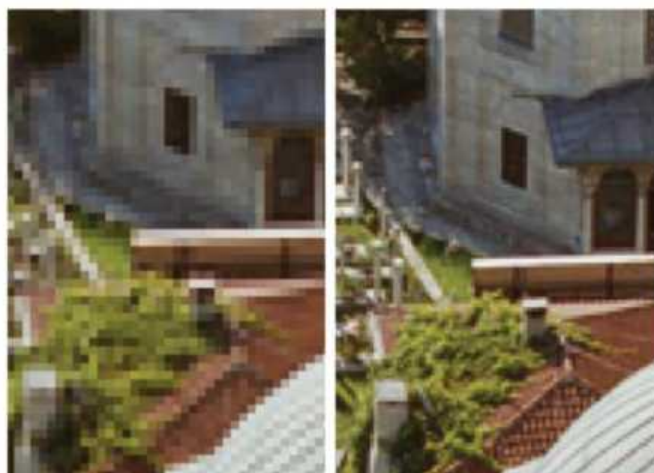


● This color chart shows the full range of color visible to the healthy human eye, with the smaller overlaid triangle containing the Rec. 709 color space used for HDTV, and the larger the full Rec. 2020 space built into the UltraHD standard. The DCI (P3) color space currently targeted as an interim step for new UHD content falls in between the two.

visible banding that can sometimes occur when the set has too few choices.

Our current HD system uses 8-bit color encoding for the red, green, and blue color channels that make up video images. Do the math, and you'll find that your HDTV is capable of displaying up to 16.8 million possible colors.

● In this simulation, the pixels that make up each image are magnified to show the relative difference in the aliasing and stair-stepping between 2K and 4K resolution.



● Along with exposing jaggies, close-up viewing of a digital display of insufficient resolution can reveal individual pixels and the gaps between them, creating the screen-door effect.





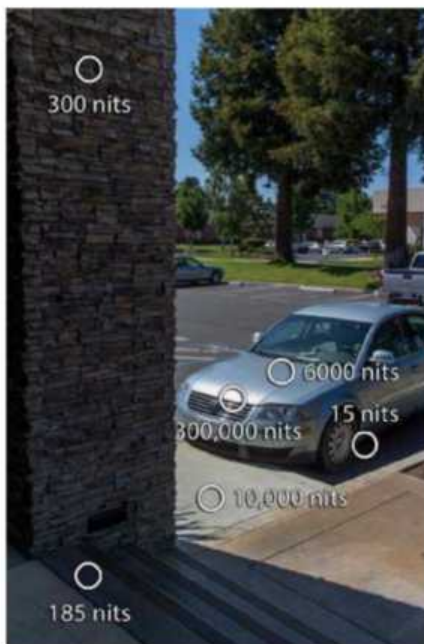


Seems like a lot, right? But Ultra HDTV is capable of 10-bit color encoding. When a video source with 10-bit color is displayed on a compatible TV, the end result is a potential *1 billion* colors. While final specs for UHDTV broadcasting (ATSC 3.0) have yet to be hammered out, the specs for the forthcoming UHD Blu-ray format support 10-bit color, and both Netflix and Amazon have announced plans to deliver 4K content with an extended color range.

Unfortunately, not all Ultra HDTVs fully support both the P3 color gamut and 10-bit color, which is why you'll need to do careful research when shopping for a new set. Here's one thing to keep in mind: Displays that support 10-bit color are also compatible with another new TV development, High dynamic range.

### More, Better Brightness

HDR refers to images with a brightness range beyond what's usually contained in HDTV or



● **This chart and image, courtesy of Dolby, show the relative light levels of common real-world objects in candellas and nits, respectively. Most non-HDR displays today max out around 300 nits, woefully inadequate for truly realistic highlights.**

UHDTV content. Blacks are deeper and have greater detail; peak whites are brighter and show more detail in highlights. Here's how the process unfolds. HDR images are captured by new digital cinema cameras capable of a minimum 15 steps of dynamic range (film also is capable of a wider dynamic range than is usually exploited). During post-production, the extended brightness information is converted to metadata that's embedded alongside the Ultra HD video stream. At home, a set with a 10-bit display capable of reading the HDR metadata dynamically adjusts its picture to convey the extended brightness information.

Among the UHDTVs introduced in 2015 that are HDR compatible (meaning that they'll recognize an HDR-encoded signal and make use of it) are Samsung's JS9500 series LCDs and some of its other SUHD models, Sony's X940C and X930C LCD sets (plus the X910C, X900C, and X850C via a forthcoming firmware upgrade that may be in place by the time you read this), LG's EG9600 and EF9500 series OLED models, Panasonic's TC-65CX850U LCD TV, and Vizio's 65-inch and 120-inch (\$130,000—ouch!) Reference series TVs. (See our First Look at the Vizio RS120-B3 on page 54.)

Presently, several companies have tossed

proprietary systems into the HDR ring, including Dolby, Philips, and Technicolor. Apparently, the situation has become confusing enough that the Society of Motion Picture and Television Engineers (SMPTE), a standards-setting organization for the media and entertainment industries, has stepped in to devise a standard for the creation and distribution of HDR content—one that reportedly conforms to the Dolby Vision format.

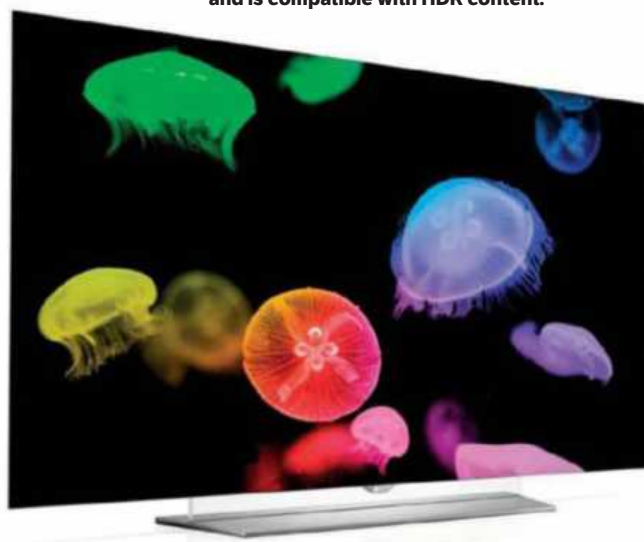
It's unclear whether consumers will have to contend with multiple HDR sources that may or may not be compatible with their TV. In the meantime, the Consumer Electronics Association has defined a minimum set of attributes for an HDR-compatible UHDTV, which reads as follows:

- Includes at least one interface that supports HDR signaling as defined in CEA-861-F, as extended by CEA-861.3.
- Receives and processes static HDR metadata compliant with CEA-861.3 for uncompressed video.
- Receives and processes HDR10 Media Profile from IP, HDMI, or other video delivery sources. Additionally, other media profiles may be supported.
- Applies an appropriate Electro-Optical Transfer Function (EOTF) before rendering the image.

These guidelines, while vague and indeed somewhat inscrutable, are meant to give consumers at least some level of assurance that a TV labeled as HDR compatible will actually have some minimum degree of HDR compatibility.

The first bullet point in the above list concerns the version of the HDMI interface included on Ultra HDTVs. Virtually all new UHDTVs that shipped in 2015 provide an HDMI 2.0 interface. However, external sources such as the forthcoming UHD Blu-ray players require an HDMI 2.0a link to transmit HDR-encoded content to the TV over HDMI (onboard streaming platforms are another matter). Manufacturers including Samsung, Sony, and LG have all announced that they will be making a firmware update available for their HDR-compatible

● **LG's recently released EF9500 series UHDTV exhibits OLED's infinite contrast and is compatible with HDR content.**



oppo

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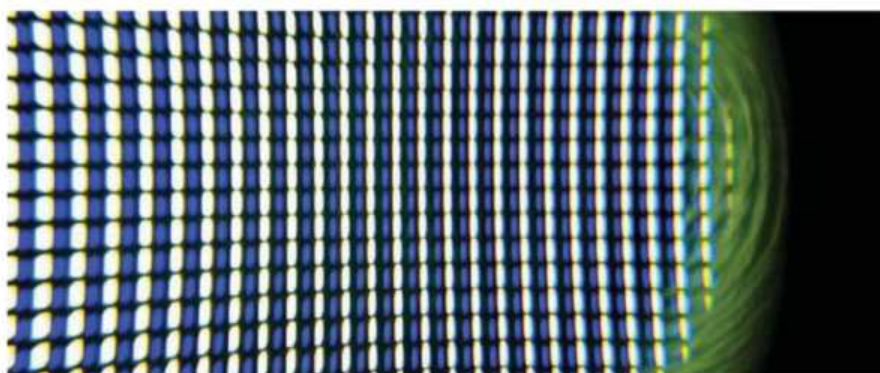
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OPPO Digital, Inc. | [www.oppodigital.com](http://www.oppodigital.com) | Menlo Park, CA







● **LG's OLED technology adds a fourth white subpixel to the usual red, green, and blue primaries to help improve color accuracy and brightness and reduce power consumption. Below, a closeup of an LG OLED reproducing a neutral white test pattern (approximately 6500K color temperature) primarily fires up the white and blue subpixels, unlike traditional displays that must derive white from a mix of red, green, and blue.**

UHD TVs that will allow them to upgrade to HDMI 2.0a. (Only one company, LG, has stated that one of their UHD TV lines—the EG9600 series OLED models—won't be upgradable to HDMI 2.0a.)

But while the HDMI interface version could prove to be an impediment for certain UHD TVs to receive HDR, the same issue doesn't apply to streaming services. The LG EG9600 models will still be capable of displaying HDR content from Amazon (at least) via their internal smart TV streamers. Netflix and Vudu have also announced that they will be making a limited amount of HDR content available to subscribers—at this writing, Vudu has announced that 18 HDR-encoded movie titles will be available with Dolby Vision encoding to help launch Vizio's Reference series TVs. Amazon got the early jump on the competition by making two shows available in HDR for Amazon Prime subscribers using compliant TVs: the full *Mozart in the Jungle* series and the pilot for *Red Oaks*. So if a UHD TV is HDR-capable, it should be

able to display HDR content from one or all of those services regardless of the version of its HDMI inputs.

### How Awesome Is OLED?

One of the most impressive advancements in TV tech over the past few years has been the introduction of OLED screens, for both HD and Ultra HD sets. OLED technology differs from LCD technology in that the pixels in an OLED TV are self-illuminating; there's no backlight required. What's more, the pixels can shut off completely to create absolute black. This gives OLED a distinct advantage over LCD, where the backlight always results in some degree of light leakage that has the effect of reducing contrast. OLED TVs, on the other hand, provide infinite contrast, and they're free of the screen-uniformity and off-axis viewing issues that plague most LCD TVs.

At present, only LG is selling OLED TVs in the U.S. (Panasonic recently unveiled a 65-inch model,

but pricing and availability are announced for Europe only.) Their current (and recently expanded) lineup includes models with both curved and flat screens, starting at \$1,800 for a 55-inch, 1080p model up to \$25,000 for a 77-inch Ultra HD model. UHD TVs in the popular 55- and 65-inch sizes recently underwent volume-driven price cuts that brought them into the range of \$3,000 to \$5,000—a reasonable premium that LG hopes will drive OLED into the mass market.

Both the curved and flat versions of LG's OLED Ultra HDTVs support HDR, but as mentioned above, the HDMI ports on the EG9600 models are HDMI 2.0 and can't be upgraded to version 2.0a.; only the EG9700 curved-screen and EF9500 flat-screen sets are compatible with both internally streamed and external HDMI sources. Another thing to consider: Despite being HDR-compatible, LG's current OLED sets are apparently capable of only half the peak brightness levels that LED-backlit LCD sets (such as Samsung's flagship JS9500 models) can achieve. This could make them less capable of delivering on the promise of HDR once a sufficient amount of content becomes available for experts to make informed comparisons. However, the fact that OLEDs are capable of "infinite contrast" and can measure their overall dynamic range from a lower floor for black level means they still may be capable of displaying images that can be considered sufficiently HDR—once a detailed set of minimum specifications for that content is ultimately issued.

### Here's What You Should Buy

I wish it was that easy! Unfortunately, there isn't any simple, formulaic advice we can give during this transitional period for TV. The picture-quality enhancements promised by High Dynamic Range are considerable, so any new set you're considering as your long-term, primary television solution should be HDR compatible. That said, it's impossible to predict right now if one HDR format will end up being dominant, or if all the displays and sources going forward will support the full range of proprietary HDR formats from Dolby, Technicolor, Philips, and whoever else decides to throw their hat into the ring. At least you'll know that any HDR-compatible TV you buy will be capable of supporting 10-bit color from forthcoming UHD Blu-rays and various streaming sources.

There's no harm in buying a curved screen, but in most cases, it provides no picture-quality benefit over flat-screen models, and it may also cost more. As for OLED, that technology can offer a substantial picture-quality benefit over LCD, so it's well worth checking out. LG's OLED models have recently seen dramatic price drops. In some cases, you may find minimal price difference between an OLED model and a high-end LCD with the same screen size. So if you're interested in OLED, now may be the perfect time to bite.

Then again, you could always go for a budget 1080p set for now and wait for things to settle out on the UHD/HDR front. The choices are yours to make—as long as you're knowledgeable and equipped to make them. ●

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# Atmos and More

By David Vaughn

## Yamaha Aventage CX-A5100 Surround Processor

**PRICE \$3,000**

**AMAZINGLY, YOU** CAN BUY A pretty damn good AVR these days that's Dolby Atmos-enabled for under \$500, so why spend more if you don't have to? Well, there are many reasons: better-quality DAC chips, enhanced features (such as multiple zones for both audio and video), and more channels of audio and associated amplification. You can also usually count on these upgrades when you move into the realm of the preamp/processor (also known as a surround processor), though with pre/pros, you're left on your own for the amplification. It's kind of like an impromptu college party that advertises BYOB—except, it's BYOA: Bring Your Own Amp(s)!

Unlike the AVR market, however, your options are somewhat limited when shopping for a pre/pro, especially in the \$1,000-to-\$5,000 price range. There are three major players here—Yamaha, Marantz, Onkyo (and its sister brand Integra)—as well as lesser-known products from some Internet-direct companies.

The three majors all offer Atmos-enabled pre/pros with a bevy of similar feature sets, but only Marantz and Yamaha so far have promised an upgrade to the Atmos competitor DTS:X. The Yamaha CX-A5100 sits in the middle of the pack price-wise at \$3,000

### AT A GLANCE



Plus

- Audiophile sound quality
- Best-in-class control for iOS and Android
- Dolby Atmos and DTS:X support
- Built-in MusicCast multi-room audio



Minus

- Slow to lock onto HDMI signals
- YPAO doesn't equalize below 31 Hz

(not counting a limited-time Yamaha promotion that brought it to \$2,500 as of early November). But it offers a boatload of features to accompany its flagship status in the company's Aventage line of products.

### Black Is Beautiful

The "fit and finish" of the CX-A5100 is outstanding; it's definitely built like a tank. The classy aluminum front panel is what you'd expect at this price point. The enclosure features a sturdy frame with an H-shaped crossmember for rigidity. Attached to the center of the underside of the chassis is Yamaha's proprietary ART (Anti-Resonance Technology) Wedge, which acts not only as a supportive fifth foot, but is claimed to provide vibration

control for the internal circuits. These circuits include ESS9016 Sabre32 Ultra DACs on all channels, Bluetooth and Wi-Fi for wireless music streaming, Yamaha's new MusicCast multiroom audio support (untested here, but see sidebar on page 41), and HDMI 2.0a (with HDCP 2.2) supporting both 4K and HDR (High Dynamic Range).

The front panel is well designed and a breeze to navigate. It includes an easy-to-read LCD screen (something that's becoming more important to me the older I get), a power/standby button, an input selector on the left, a sturdy volume control on the right, and a tiny Pure Direct button on the upper right. There's a flip-down panel on the center of the unit that hides various controls and ports, including a front-panel HDMI input, a headphone jack (gold plated), and a USB input.

The rear panel isn't quite as crowded as what I've seen on other pre/pros, and that's a good thing. There is enough connectivity for the vast majority of enthusiasts, including seven HDMI 2.0a ports with HDCP 2.2 and two HDMI outputs (multizone compatible) on the rear panel. Balanced and unbalanced analog audio outputs are provided for all 11 channels plus dual subwoofers (13 outputs in total—an upgrade over the last generation of Yamaha pre/pros). The unit also includes a single balanced analog audio input that's intended for high-performance stereo source components with compatible outputs, such as some CD/SACD or universal disc players like the Oppo BDP-105D.

With 11.2 channels of support, you can choose to have a traditional Atmos setup with four overhead speakers or use four height speakers (two front, two rear) to utilize the wealth of Cinema DSP modes that Yamaha is famous for. The DSP modes work with Atmos as well, but they still sound gimmicky to me either way.

Other rear-panel connections include an Ethernet port, dual 12-volt trigger outs, an RS-232C port for control systems, and a wireless antenna. You also get a phono input and ground screw; who would have thought that vinyl would be making such a comeback?

Video processing is handled by a proprietary solution and supports 4K Ultra HD video (native or scaled), and it can pass through the signal unmolested if you use an outboard processor or are pleased with the way your display handles content of varying resolutions. As you'll see in the Test Bench results, the processor fared quite well, other than failing the 2:2 HD test (a common failure), and it handled the luma and chroma signals with no rolloff.

You can connect the Yamaha to your home network either wired or wirelessly, and with its DLNA (Digital



● Controls reside behind a slick flip-down panel.



## RATING

Yamaha Aventage CX-A5100  
Surround Processor

Audio Performance ★★★★★  
Video Performance ★★★★★  
Features ★★★★★  
Ergonomics ★★★★★  
Value ★★★★★

## THE VERDICT

Yamaha's Aventage CX-A5100 is an incredible value in the sub-\$5,000 pre/pro market, with stellar audio and a suite of usable features to keep an A/V enthusiast happy until the next upgrade cycle comes around.

## SURROUND PROCESSOR

**YAMAHA AVENTAGE CX-A5100 SURROUND  
PROCESSOR**

**PRICE:** \$3,000

Yamaha • (714) 522-9105 • [usa.yamaha.com](http://usa.yamaha.com)



Living Network Alliance) compatibility, it can stream virtually every audio format you can throw at it, including WAV (PCM format only), MP3, WMA, MPEG-4, AAC, and FLAC (one or two channels only). It can accommodate sampling rates of up to 192 kilohertz for WAV, FLAC, and AIFF files and up to 48 kHz for others. You can also stream music directly with Internet Radio as well as Pandora, Spotify (premium account required), Rhapsody, and SiriusXM. For those who are part of the Apple ecosystem, it has AirPlay as well. No need to get up from your couch and change CDs anymore; no wonder Americans have put on so much weight! This convenience extends to the unit's MusicCast functionality, which allows the CX-A5100 to act as an app-selectable zone for playback of other networked sources through your theater system, and also lets MusicCast-compatible speakers in other rooms tap into the various sources connected to the pre/pro.

The stock remote appears to be the same model that came with the predecessor CX-A5000 (*Sound & Vision*, January 2014, [soundandvision.com](http://soundandvision.com)), and it's more than functional. I love its backlit design and sturdy build quality. The major keys

are easy to locate by touch, but the inputs are labeled by number instead of device name, so the baby sitter may need to undergo some trial and error to find the right input for the cable box.

Yamaha's stellar control app supports multiple platforms, including Android and Apple. It can power the unit on and off, set the volume and input, and choose any of the 33 DSP programs. I used the iOS app on my iPad and was amazed at how quickly the unit responded to commands, especially when I changed audio tracks streamed from my Windows Home Server.

The YPAO-R.S.C. room-correction software is proprietary to Yamaha, and the CX-A5100 ups the ante on other Aventage-branded products with a new 64-bit version (versus 32-bit). This allows the unit to apply correction to lossless files at full 192-kHz/24-bit resolution without decimation/downsampling—something that most other EQ solutions can't do (they often decimate/downsample to 48 kHz). Like previous versions of YPAO-R.S.C., the software analyzes the acoustics in the room via up to eight microphone positions and also performs speaker angle measurements, then calibrates the audio

parameters to achieve optimum sound. The R.S.C. attempts to correct for any early reflections, and it also provides DSP Effect Normalization, which varies the Cinema DSP parameters according to the reflective nature of your room.

The process takes about 15 minutes to measure eight positions and is well worth the effort, for various reasons. First and foremost, it nailed the distance of my speakers from my main listening position to within 1 inch and saved the time of having to enter this information manually. Furthermore, it did a commendable job of setting speaker levels in my room, which I verified with my SPL meter.

But always double-check all the settings. The YPAO software initially set my center speaker to large and my front left and right to small, which was a head-scratcher, considering that all three are identical M&K S150 speakers. Additionally, it set two of my four Atmos speakers (Atlantic Technology IC-OBAs) to large as well. I manually set all of them to small and set all crossovers to 80 hertz per THX's recommendation.

Additionally, when I went through and looked at how each speaker was

set via the EQ, I noticed that there were only very slight changes made to my main speakers and virtually none to my dual subwoofers. This could be because my room is treated already and was in little need of adjustment, though YPAO as executed here won't EQ bass frequencies below 31 Hz, where some rooms might have issues. For those inclined, with the proper calibration equipment, the EQ can be set manually with a plethora of adjustments at your disposal. If I owned the Yamaha, this would definitely become a winter weekend undertaking in order to squeeze out every ounce of audio performance.

## I Heart Object-Based Audio

Setup of the unit wasn't difficult, given my experience with Yamaha products in the past. I hooked up the CX-A5100 via XLR connectors to a couple of Parasound amps, the A 51 for the five main channels and the ZoneMaster Model 1250 for the back surrounds and Atmos channels (using XLR-to-RCA cables). Source components used in the evaluation included a TiVo Series 3 HD DVR (HDMI), Squeezebox Touch (coax digital), Oppo BDP-103D (HDMI), and a Windows Home Server to stream various FLAC files over Ethernet. One thing I noticed right away after getting things running was that the CX-A5100 was somewhat sluggish in connecting to my HDMI sources, taking as much as 10 to 15 seconds to lock down the new signal when I switched between my Oppo disc player and TiVo. This was annoyingly slow compared with my Marantz reference pre/pro. Perhaps Yamaha can speed things up with a future firmware update.

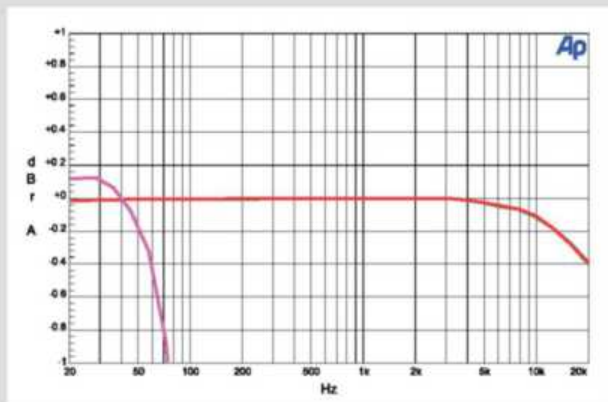
I didn't catch the first season of *The Flash* until it made its debut on Blu-ray, and it was definitely worth the wait. The show features a great ensemble cast, an interesting story line of how



● **Controls and ports are hidden behind a flip-down panel, giving the Aventage a clean, high-end look.**

# Test Bench

## Yamaha AVENTAGE CX-A5100 Surround Processor



**AUDIO** Frequency response at preamp outputs of Dolby Digital decoder: Left (aqua):  $-0.01$  dB @ 20 Hz,  $-0.39$  dB @ 20 kHz. Center (green):  $-0.01$  dB @ 20 Hz,  $-0.40$  dB @ 20 kHz. Left Surround (red):  $-0.01$  dB @ 20 Hz,  $-0.39$  dB @ 20 kHz. LFE (purple): Normalized to level @ 40 Hz:  $+0.12$  dB @ 20 Hz, upper  $-3$  dB @ 96 Hz, upper  $-6$  dB @ 117 Hz.

Analog frequency response in Pure Direct mode:

$-0.04$  dB at 10 Hz  
 $-0.01$  dB at 20 Hz  
 $-0.33$  dB at 20 kHz  
 $-1.82$  dB at 50 kHz

Analog frequency response with signal processing:

$-0.54$  dB at 10 Hz  
 $-0.16$  dB at 20 Hz  
 $-0.57$  dB at 20 kHz  
 $-21.70$  dB at 50 kHz

Response from multichannel input to main output:  $-0.04$  dB @ 10 Hz,  $-0.01$  dB @ 20 Hz,  $-0.02$  dB @ 20 kHz,  $-0.09$  dB @ 50 kHz. Analog THD+N: less than 0.008% at 1 kHz w 100-millivolt input and volume control set to  $-3$ . Crosstalk w 100-mV input:  $-93.82$  dB left to right,  $-94.21$  dB right to left. Signal-to-noise ratio w "A" weighting:  $-130.92$  dBBr. —MJP

## SPECS

**Auto Setup/Room EQ:** YPAO-R.S.C. • **Video Processing:** Proprietary video processing with 4K scaling and passthrough (HDR support will require future firmware update) • **Dimensions (WxHxD, Inches):** 17.13 x 7.5 x 18.63 • **Weight (Pounds):** 29.8 • **Video Inputs:** HDMI 2.0a (8, 7 with HDCP 2.2), component video (3), composite video (5) • **Audio Inputs:** Coaxial digital (3), optical digital (3), stereo analog (8), stereo balanced (1), Multichannel analog (1), phono (1) • **Video Outputs:** HDMI 2.0a (2), component video (1), composite video (1) • **Audio Outputs:** 11.2-channel pre-out XLR (1), 11.2-channel pre-out (1), stereo analog (2), 1/4-inch headphone (1) • **Additional:** USB (1), Ethernet (1), Wi-Fi antenna (1), IR remote in (1), IR remote out (1) AM antenna (1), FM antenna (1) RS-232 (1), 12-volt trigger (2)

Flash obtained his powers, and a mix of cool audio effects that sound fantastic in the Blu-ray's DTS-HD Master Audio 5.1 presentation. As the show opens, a young Barry Allen and his mother are sitting on the living-room floor with all hell breaking loose around them. Some type of supersonic battle is happening, with flashing blurs and hurricane-like wind, and the CX-A5100 transports you into young Barry's world. The wind engulfs the room, and you can hear his mother's cries very clearly from the center speaker. Next thing you know, Barry is instantly whisked out to the silent nighttime street as the young kid doesn't realize how his life has forever changed. With DSU (Dolby Surround Upmixer, which takes stereo or non-Atmos multichannel soundtracks and scales them up for the Atmos speakers), the Yamaha performed flawlessly in re-creating the hectic environment—and that was the first of many exhilarating audio experiences with this pre/pro.

*San Andreas* is a mediocre (at best) summer action movie, but it includes one of the most engaging Atmos tracks to date. It takes full advantage of the format by placing sounds throughout the room in order to draw you into the picture. The first scene includes a helicopter rescue of a car that has rolled over an embankment. The sound mix places you right in the compartment of the car, creating the morbid feeling that you're about to fall to your death. Once the helicopter

• **Yamaha's remote is backlit and sturdy, with well-placed buttons.**



arrives, the overhead speakers really spring to action, serving up that "you are there" experience to the nth degree—and this is just a warm-up for what's in store for you later. The Yamaha really showed its prowess with movie soundtracks, and I dare anyone to watch *San Andreas* in Atmos and not get the bug to upgrade. Yes, it's that good.

Two-channel performance was almost as enjoyable but didn't quite reach the jaw-dropping level I hoped for. That's not to say the Yamaha sounded bad here—it featured a smooth presentation, clear vocals, and an engaging experience—but compared with

what I've heard in my room from the Krell Foundation (\$6,500, review at soundandvision.com) or my Marantz AV-8802A reference pre/pro (\$4,000), it wasn't quite as transparent and alive. This was apparent not only with high-resolution files downloaded from HDtracks but also with ripped CDs on my server as well as some SACD and DVD-Audio discs I played.

One song that stood out was Marti Jones' "Second Choice" (*Live at Spirit Square*, Sugar Hill, 1996). The recording blew me away with crystal-clear dynamics, just like I'm used to with the Marantz, but the two pre/pros definitely sounded different. I switched through the various YPAO settings (Manual, Flat, Natural, and Through). Flat sounded the best with prioritized vocals, but the pluck of the bass guitar and the kick of the drum were slightly more laid-back than I've grown accustomed to over my past six months with the Marantz. Still, it



• **The AVENTAGE's rear panel is less crowded than that of many surround processors.**



was just a different sonic signature, and some may prefer the smoother sound of the Yamaha.

## Conclusion

I've really enjoyed my time with the Yamaha CX-A5100, and frankly, I

could live with this pre/pro in a heartbeat if I hadn't recently upgraded. The two-channel performance sounds fantastic (if slightly different from what I'm used to), and for movies, which are my passion, this beast kicks some

serious tail. With the promise of a DTS:X upgrade in the works (which may be in place by the time you read this), it has everything a movie buff needs to get away from the real world. Highly recommended. ♦

## ● Yamaha MusicCast NX-N500 Powered Monitor Speakers



# With MusicCast, Yamaha Takes on Sonos

Along with its advanced surround capabilities and high-performance sound, Yamaha's new CX-A5100 preamp/processor offers another powerful feature: MusicCast, Yamaha's new wireless multiroom music system. Old *Sound & Vision* readers may recall that name from a wireless multiroom solution Yamaha offered in the early 2000s, but beyond the intent, this MusicCast shares nothing in common with the original. The new app-based, Wi-Fi-driven system is very much in the profile of the pioneering Sonos digital music system (which is said now to have more than 90 percent of this still immature market), and those of recent competitors including Denon's HEOS, Bose's SoundTouch, LG's Music Flow, NAD's Bluesound, and others.

Perhaps the virtue of waiting to enter this emerging cat fight is that Yamaha has managed to bring its own twist. As a longtime industry leader in A/V receivers, and a strong force in the soundbar category, the company has a distinct advantage over those other Johnny-come-latelies. Unlike Sonos (and more like NAD with its Bluesound brand), Yamaha can integrate MusicCast in its other established product lines, moving it into the homes of unsuspecting consumer homes in Trojan horse fashion. And that's just what they did, massively launching the system last summer with more than 20 products. It turns out that if you purchased pretty much any Yamaha AVR from the 2015 model year (10 models in all) prior to mid-August, it had the unannounced ability (with a firmware update) to

become a MusicCast player, recognizable by the MusicCast app and selectable as a zone. Add to this the CX-A5100 surround processor, two new soundbars (including an Atmos-and DTS:X-compatible unit) and a new soundbase, a new compact powered tabletop speaker, and an \$800 pair of powered high-performance studio monitors Yamaha normally sells to the pro audio industry—all introduced with or adapted for MusicCast compliance.

With this kind of broad ecosystem and its heritage in sound, Yamaha built in some neat capabilities audiophiles will applaud. Among them is the ability to send hi-res audio formats to all MusicCast components including ALAC (Apple Lossless) up to 96-kHz/24-bit; FLAC, AIFF, and WAV files up to 192/24; and DSD up to 5.6 MHz. At this point, the only similar digital multiroom systems we're aware of that can handle hi-res files are Bluesound and the pending Raumfeld system (December 2015, review available at [soundandvision.com](http://soundandvision.com)).

Also, since the MusicCast app knows the inputs available on any device in the system and can control input selection, every source input on any MusicCast-compliant AVR, soundbar, or surround processor is available for multiroom distribution along with the usual networked music library and Wi-Fi streaming services you might have on a Sonos system. For AVRs, that includes the over-the-air AM/FM tuner, a cable box, or even a turntable connected to the phono input. Sonos and some of the others do allow connection of local source components to the system through their standalone player modules, but typically only one per module.



## ● Yamaha MusicCast WX-030 Wireless Speakers

sleek brushed-finish top that integrates touch controls for power, track advance or backskip, and volume. Sonics are provided by a 3.5-inch woofer and 1.125-inch fabric-dome tweeter and, notably, a passive radiator on the rear that greatly helps with bass reinforcement. It's all driven by a 30-watt digital switching amplifier.

My initial impressions of sound quality on the WX-030 with streaming

In keeping with current trends, the MusicCast control app (for iOS and Android smartphones and tablets) allows integrated access to several popular music streaming services including Pandora, Spotify, Rhapsody, Sirius XM, and vTuner, with more said to be on the way. While that's not unusual, Yamaha has put some serious thought into the app design to make it highly graphic and intuitive to use. Notably, room/zone selection is done via a scroll with your actual room photos as buttons (see above). Content source buttons can also be renamed and organized by the user in the order they like.

As we were going to press, Yamaha sent me a couple of samples of their new WX-030 MusicCast Wireless Speaker to set up a MusicCast multiroom network and try it out. Priced at \$250, the WX-030 is a mono speaker about the size of Sonos's \$299 Play:3 (though bigger than the \$199 Play:1). It features an attractive trapezoidal design, with a



sources was favorable, and I appreciated Yamaha's thoughtful inclusion of easily-accessed bass, midrange, and treble adjustments from the "what's playing" screen of their app, something that Sonos makes you dig deep into the menus for. Getting the initial MusicCast network going proved a bit tricky until I figured out what Yamaha was asking for in the somewhat unintuitive app-based prompts, but once I got things going and got used to the app, adding the second WX-030 was a breeze and day-to-day zone and source selection was as instinctive as I've come to expect from Sonos. We'll follow up with a more complete review.—Rob Sabin



## ● Yamaha MusicCast RX-A550 A/V Receiver



## ● Yamaha MusicCast YSP-5600 Soundbar

# Flat-Panel Atlas

By Mark Fleischmann

## PSB Alpha VS21 VisionSound Soundbase and SubSeries 150 Subwoofer

**PRICE \$1,098 as reviewed**

**SOUNDBASES AND BARS** HELP the audio industry stay relevant to consumers. Maybe not everyone is interested in traditional loudspeakers and receivers, but most people have a flat-panel TV, and all but the least observant of those people have noticed that the built-in speakers produce sound that is less than coherent. Many of those consumers may not know that PSB has been producing great-sounding audio products for decades, so we have a fundamental disconnect between a brand that is (relatively) unrecognized by newbies and a product category that attracts them. What will it take to bring a PSB soundbase to the newbies? Maybe their better-informed friends who read *Sound & Vision* should have a word with them—especially when they're seen pulling a big flat-panel TV box out of the hatchback. Just sayin'.

### Atlas Does Not Shrug

The compact PSB Alpha VS21 VisionSound is made for smaller TVs. It handles sets weighing less than 88 pounds and is said to provide a good sonic match for screens up to 50 inches. Where you might run into trouble is fitting your flat-panel's pedestal base or legs onto its small 21.38 x 13-inch resting surface with a bit of room to spare for safety—measure carefully, or plan on putting it on its own shelf below the TV. The PSB's heavily braced, vinyl-clad fiberboard casing is several cuts above cheap plastic enclosures. The cloth grille wraps around the cabinet,

leaving space in front for a row of pinpoint LED indicators. When the unit powers up, the multicolored LEDs light up en masse, which is kind of endearing.

There are no controls on the unit itself—possibly a problem if you lose your remote. On the other hand, along with responding to the supplied remote, the PSB can be programmed to learn commands from your existing TV, cable box, or satellite box remote, so in all likelihood you'll be able to put your hands on one or the other. The smallish remote has buttons for on, off, listening mode, setup, and mute, as well as a navigation ring that includes volume and input selection. Big plus: The buttons aren't the pain-in-the-neck membrane type, but the remote does use a pain-in-the-neck coin cell battery in lieu of easier-to-find AAA cells.

The back panel doesn't have HDMI connections but does have digital optical, digital coaxial, and stereo analog RCA inputs—one each—plus a subwoofer output. There's also a Mini USB input for service use only. Bluetooth is supported with the higher-quality aptX codec, useful if you have an aptX-compliant source.

Behind the grille are two three-way speaker systems with three pair of drivers. They include 0.75-inch textile-dome tweeters, 2-inch treated-paper-cone midranges, and 4-inch treated-paper-cone woofers that fire out the bottom of the cabinet. Electronic crossover points are 3 kilohertz from midrange to tweeter, and 350 hertz between midrange and woofer. Bass

response is claimed down to 40 Hz (see our measurements). *[Ed. Note: PSB rates that bass output of 40 Hz at the -10 dB point, which makes it not very loud or of much impact. We measured the -10 dB point at a higher 50 Hz, and our conventional -3 dB and -6 dB points at 60 Hz and 54 Hz, respectively. See Test Bench.]*

Each driver has its own 17-watt RMS amplifier and limiter/compressor, for a total system output capability of just over 100 watts, though PSB says the system typically consumes just 10 watts, even at high levels. When the system isn't used for 20 minutes, it goes into standby mode at an energy-saving 0.5 watt. Standby can be disabled if you get a lot of long phone calls.

### Modes à la Mode

The VS21 has Dolby Digital 5.1 decoding on board. The surround effects from this kind of one-piece product are usually limited. (There are reasons why people still buy 5.1-channel speaker systems and AVRs.) When receiving a Dolby Digital multichannel signal, the unit performs its own stereo mixdown. It accepts other formats only when the source component converts them to stereo PCM (generic digital).

In lieu of the usual faux-surround mode,

### AT A GLANCE



- Sound that transcends genre
- Subtle surround and dialogue modes
- Flat sub hugs the wall



- No front-panel controls
- No tone controls
- Too small for larger TVs

VisionSound offers a WideSound mode. Paul Barton, PSB's founder and chief designer, describes WideSound as "a DSP algorithm that extracts the left-channel-only and right-channel-only signals and manipulates and re-inserts this information into the opposite channel with some phase shift. The result is that the soundstage is perceived to be wider than the location of the source. The distance between the left and right channels is taken into account with this processing."

The Dialogue mode exploits hearing research from Canada's National Research Council and boosts "dialogue clarity frequencies" by 3 decibels, which is subtle enough not to totally bend frequency response out of shape. The Dolby Late Night mode employs Dolby

● The vinyl-wrapped cabinet looks classier than typical plastic-encased soundbars.





## RATING

PSB Alpha VS21 VisionSound Soundbase

Performance ★★★★★

Features ★★★★★

Ergonomics ★★★★★

Value ★★★★★

## THE VERDICT

The PSB Alpha VS21 and SubSeries 150 might change your mind about whether soundbases and compact subs are suitable for music.

## SOUNDBASE

### PSB ALPHA VS21 VISIONSOUND SOUNDBASE AND SUBSERIES 150 SUBWOOFER

PRICE: \$1,098 (base, \$599; sub, \$499)

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Digital's built-in dynamic range control (not the newer Dolby Volume). It uses flags (unfortunately only embedded in Dolby Digital content) to reduce the variation between soft and loud sounds, making it easier to reconcile dialogue and effects when playing a movie at low volume. Dolby Late Night is accessible from the setup menu, which requires holding down the remote's setup button for five seconds. The menu also allows activation of the sub output. Doing so restricts the internal speakers to operating only above 80 Hz, and with a 500-Hz low-pass filtered output, essentially leaves adjustment of blending with the sub to the sub's own crossover control. There's also a lip-sync mode, which adds delay in 10-millisecond increments up to a maximum of 110 ms.

White legends printed on the front panel identify the LED indicators of these modes along with those of the three inputs, Bluetooth, and the selected listening mode. Some bases and bars identify listening modes by flashing their cryptic acronyms on the front panel. With no alphanumeric display, VisionSound instead changes the Mode LED's color-coding: no LED for Stereo, amber for Dialogue, green for

WideSound, and blue for WideSound Plus, which combines the WideSound and Dialogue modes. The Mode LED is at far right, where it's easy to see, so you always know where you stand with this system. One feature I missed was a numeric meter or bar indicator for volume level; it's impossible to see where you are on the volume scale.

The SubSeries 150 subwoofer has a slim form factor less than 4 inches deep. It can be placed against the wall, standing vertically on movable rubber feet, placed lying horizontally, or mounted to the wall with supplied hardware. Build quality is quite impressive. Inside the glossy, heavy, sealed enclosure are a 6.5-inch polypropylene-cone driver behind a perforated metal grille and a 100-watt RMS amplifier. Although this is a small sub, it's not under-featured. The convenient top-mounted (when vertical) controls include volume, 50- to 150-Hz crossover, power toggle, and continuously variable phase (not just 0° and 180°). The inputs are supplied with shorting plugs, which reduces noise from those not currently in use. PSB says the sub reaches 26 Hz at -3 dB; see our measurements. [Ed. Note: We measured -3 dB at 31 Hz, somewhat near the spec and quite impressive for a sub with such a svelte form factor.]

Non-HDMI bases and bars generally use the TV as the switching center. I



used a supplied optical cable to connect the VS21 to my TV, and HDMI to connect the TV to an Oppo BDP-83SE universal disc player and Samsung cable box provided by Time Warner Cable. Sometimes, I prefer to listen to music with the TV off—so I also made a redundant digital coaxial connection between the VS21 and the disc player. This connection also ensures that 5.1-channel Dolby Digital signals from the player reach the PSB intact; most TVs still downconvert multichannel signals they get via HDMI to stereo for output on their optical connection. The whole process took just a couple of minutes and was absurdly easy compared with what even an expert user goes through when setting up a typical A/V receiver.

### Lord of the Tones

The VS21 is voiced to sound like PSB's loudspeakers and headphones. In other words, it sounds superb, with a well-controlled top end, creamy mids, and reasonably substantial bass from the 4-inch woofers. (Some products this size try to get it all done with drivers no larger than 2 inches, which has obvious limitations.) I briefly tried the WideSound mode with test tones from the AVIA test disc and found that the system doesn't even attempt to approximate surround effects; it focuses more on front width, as the name suggests. The SubSeries 150

firmed up the bottom end and had plenty of output in my room. There was so much line-level gain that I never set its volume knob higher than the 9 o'clock mark, and sometimes lower.

Following a recent train of thought, I pulled the middle volume of *Lord of the Rings* (DVD, Dolby Digital) off the shelf. In addition to providing some practical life lessons—never mess with the Ents, those giant tree people, or you'll get stomped—*The Two Towers* showed off the WideSound mode to good effect. In an early scene where Gollum stalks Frodo and Sam in the rain, the surround mode widened the soundstage about a foot or so from each side of the base. The effect was subtle but pleasing. With aggressively dynamic battle and other scenes, I spent a lot of time in the WideSound Plus (surround plus dialogue) mode. Again, the effect was subtle but helpful. PSB has clearly decided to make both WideSound and Dialogue compatible with decent fidelity. You can use one, the other, both, or neither, and you'll still end up with extremely palatable sound. If you leave one mode or the other engaged and forget about it, no harm done. PSB has banished any possibility of improper settings causing bad sound from this product.

If you feed your HD or UHDTV with Blu-ray Discs, you'll often be



● The VisionSound's compact platform supports TVs up to 88 pounds.



● The slim SubSeries 150 subwoofer can be mounted on the wall.

## TEST REPORT

● Subwoofer controls include volume, crossover, and phase.



## RATING

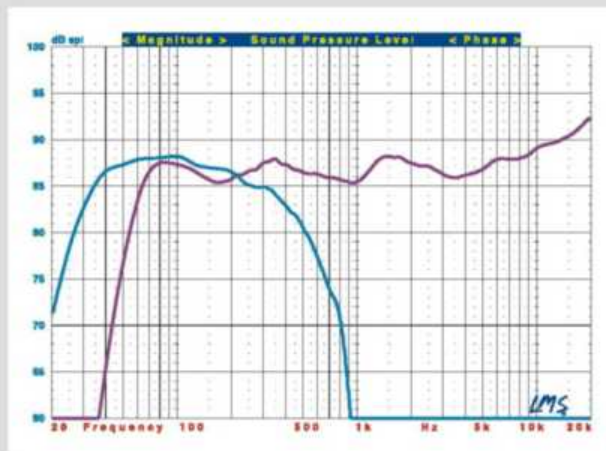
PSB SubSeries 150 Subwoofer  
Performance ★★★★★  
Features ★★★★★  
Build Quality ★★★★★  
Value ★★★★★



See [soundandvisionmag.com](http://soundandvisionmag.com)  
for full lab results and technical definitions

## Test Bench

### PSB Alpha VS21 VisionSound Soundbase and SubSeries 150 Subwoofer



**ALPHA VS21 (purple)** +2.00/-1.72 dB, 200 Hz to 10 kHz; -3 dB @ 60 Hz, -6 dB @ 54 Hz with Sub Out control switched off.

**SUBSERIES 150 (blue)** Close-miked response, normalized to the level at 80 Hz: lower -3 dB @ 31 Hz, -6 dB @ 29 Hz, upper -3 dB @ 196 Hz with Crossover control set to maximum.—MJP

## SPECS

**Alpha VS21 VisionSound:** 4 in treated-paper-cone woofer (2), 2 in treated-paper-cone midrange (2), 0.75 in textile-dome tweeter (2); digital optical input (1), digital coaxial input (1), analog RCA input (1), Mini USB-service jack (1), Bluetooth aptX; 17 watts per driver RMS (102 watts total); 21.38 x 3.38 x 13 in (WxHxD); 12.3 lb • **SubSeries 150:** 6.5 in polypropylene-cone woofer; sealed enclosure; LFE and stereo line-level inputs and outputs; 100-watt continuous amplifier; 17.13 x 10.88 x 3.88 in (WxHxD); 13.3 lb

voluptuous decay—the VS21 did approximate the tonal balance of an orchestra playing there. It was quite un-beamy, too. I

listening to lossless soundtracks downmixed to stereo. I watched *Ouija* with the Oppo downmixing the disc's soundtrack from both 5.1 DTS and 2.0 Dolby Digital. It didn't seem to make any difference; the dialogue was plenty clear either way. When the screaming started, I appreciated PSB's disciplined approach to the upper mids and highs.

The best movie ever made about a symphony is *Eroica*, with Ian Hart as Beethoven and featuring a vibrant, complete (albeit dramatically interrupted) performance of the Third Symphony by the Orchestre Révolutionnaire et Romantique (conducted off-camera by John Eliot Gardiner). Here, I simply selected stereo PCM from the disc menu. An early scene with dialogue and birdsong showed off the WideSound mode's ability to break free of the unit. Two listening firsts: I spent five minutes listening on an exercise bike, placing me above and to the left of the prime listening position. Imaging suffered, but tonal balance held firm. And, for the first time, a soundbase drew both a smile and tears—the former, when a reactionary nobleman said, "It may not be music at all," and the latter, at the very end, when elderly Papa Haydn summed up Beethoven's heroic symphony: "Everything is different from today."

### The Dialogue Exception

More Beethoven! On *The Beethoven Journey* (CD), a recording of Piano Concertos Nos. 1 and 3, Leif Ove Andsnes leads the Mahler Chamber Orchestra from behind the keyboard. I've actually paid a visit to the recording venue, Prague's Rudolfinum, one of the world's best-sounding concert halls. While the WideSound mode didn't quite conjure up the feeling of being there—including the hall's

could move around the sofa, or the room, and the system retained its musical power.

Richard Thompson's *Still* (CD) is an album that begs to be played all the way through (so I'm *Still* playing it). Taras Prodanuk's bass is a powerful and integral part of Thompson's live trio, and the SubSeries 150 provided the low-frequency oomph necessary to at least hint at the bassist's deep weight and supple force. The WideSound mode made the mix seem not only wider but timbrally livelier, at least in this selection.

While I didn't apply the Dialogue mode to most of the music I auditioned, Madeleine Peyroux's *Careless Love* (CD) was a notable exception. Larry Klein's always-excellent production steadfastly avoids reverb, delivering everything in a clean, flat, spartan style. But I yearned to better hear Peyroux's Billie Holiday-like voice, and what better way to accomplish that than with PSB's scrupulously subtle Dialogue mode? It floated the lead vocal a little above the instruments—just what I needed.

I watched a lot of TV while the PSB was in residence, including the first week of *The Late Show with Stephen Colbert*. The Dialogue mode did a good job of keeping speaking voices intelligible at a volume level appropriate for midnight-hour TV watching. The house band, Stay Human with Jon Batiste, was better served by the WideSound Plus combo mode.

There are several features I'd like to see added to this product. Chief among them are front-panel controls, which adds convenience and avoids disabling the unit from a misplaced remote. Next on the list of

priorities, a volume indicator would give listeners a better sense of how close they're getting to the system's limits. Finally, and least significantly, bass and treble controls would give users more tweakability and provide for some variability of tonal balance among different source material.

Beyond this, there's this unit's price to consider (both with or without the sub) given its potential restriction to smaller TVs.

That said, it's noteworthy that the full name of the PSB Alpha VS21 VisionSound includes *Alpha*, the longtime name

of PSB's affordable but high-performing loudspeaker line. The company is essentially saying that this product isn't just a convenient compromise or a necessary evil; it is, in fact, an honored part of a fabled speaker line, and it measures up to the high standards that PSB has upheld for many years. I'd have to agree. VisionSound isn't just a great soundbase. It's a great audio product, period. ♦

Audio editor Mark Fleischmann is also the author of the annually updated book *Practical Home Theater* ([quietriverpress.com](http://quietriverpress.com)).

● PSB's petite remote is unimposing and gets the job done.



## The VS21 measures up to PSB's high standards.



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# Nano-Crystal Clear

By Thomas J. Norton

## Samsung UN60JS7000FXZA LCD Ultra HDTV

**PRICE \$2,600**

**SAMSUNG'S NEW 60-INCH** UN60JS7000FXZA joins the majority of 4K Ultra HDTVs on the market offering 4K as their main UHD calling card. But according to Samsung, it will also respond to the metadata for high dynamic range sources and display it—though not to the same brightness level as will, for example, the company's higher-end sets, including the so-called "SUHD" UN65JS9500FXZA (*Sound & Vision*, September 2015 and soundandvision.com). The JS7000 is also claimed to respond to the wide color offered in some UHD material, in the same way as other Samsung SUHD sets, but it downconverts any 10-bit color source to 8 bits (which corresponds to fewer gradations of color being available for display).

Such full-featured UHD source material is still in limited supply. Most of it features 4K resolution but, as yet, none of UHD's advanced color or HDR, though this might have changed by the time you see this report. In any case, if you're looking for a solid-performing 4K set today, and at a good price, read on. With its \$2,600 list price and discounts online that took that as low as \$1,800 as we went to press in early November, there's some real value here.

### Tech Talk

The first thing you'll notice about the JS7000 is that it has a flat (not curved) screen. To which many of you will shout: "For that, may we be truly thankful." Sometimes, a lower price can offer benefits.



### AT A GLANCE



- Impressive resolution—in both 4K and 1080p
- Natural-looking color—even before calibration
- Appealing price



- Mediocre blacks
- Image fades off-center

The Samsung's rear panel has a full complement of connections, including four HDMI (all of them 2.0a) and three USB inputs, as well as both optical digital and analog (miniplug) audio outputs. The set is also HDCP 2.2-capable. But if you're into the (rapidly diminishing) 3D-at-home experience, you won't find that feature on the JS7000 series—though many other new Samsung models still offer it.

The JS7000's backlighting employs quantum dots, which Samsung calls Nano-Crystals. These microscopic particles emit light of a specific wavelength when energized by a blue LED, the wavelength depending on the size of the dot. In this case, the light from the Nano-Crystals is either red or green.

Combine this with the

LED's blue light, and the result is the red, green, and blue needed for a full-color image. It's claimed that this arrangement offers a wider range of color than using only LEDs, and it draws less power, too.

The Nano-Crystals, and the blue LEDs that energize them, are configured as full-array backlighting behind the LCD screen, rather than the more common edge lighting. Samsung's Website mentions full-array backlighting and (under a different subject) a contrast enhancer with "optimized contrast across multiple zones of the screen." Samsung claims that the set therefore offers a form of local dimming it calls "Precision Dimming." But while I noticed some dynamic dimming across the entire screen whenever the image faded to total black, there was no visible indication that the set offers local dimming *by zones*—the gold standard for full-array backlighting. There's no Smart LED control in the JS7000 (Samsung's name for a control that engages or defeats local dimming). Nor is there a Cinema Black control, which on some (admittedly more expensive) Samsung sets darkens the top and bottom of the image to reduce the visibility of black letterbox bars. To our knowledge, the only Samsung UHD sets that include what we would call full-array backlighting with zone dimming are the top-of-the-line JS9500s.

The JS7000 does, however, offer nearly the same range of video adjustments found in Samsung's more upscale sets. These include multiple picture modes (one of them, Sports, can be turned on and off from a dedicated button on the remote), Picture-in-Picture, Color Tone (*always* set this to Warm2), 2- and 10-point white-balance controls, a full color

### RATING

**Samsung UN60JS7000FXZA**  
LCD Ultra HDTV  
Performance ★★★★★  
Features ★★★★★  
Ergonomics ★★★★★  
Value ★★★★★

management system (CMS), and seven fixed gamma settings. There are other controls as well, though of the sort I rarely or never use, such as digital noise filters, Flesh Tone, and Black Tone.

I checked out the operation of the set's Auto Motion Plus (motion blur compensation), but I left it off for all of my measurements and viewing. Its Standard mode is the subtlest in its application of frame interpolation, but it's still clearly *As the World Turns*-ish to those of us sensitive to the film-into-video look. The Custom mode offers a Judder control (but no separate Blur control, as do many other Samsung sets) plus an LED Clear Motion control. Judder dials up the soap-opera look. LED Clear Motion appears to turn on black- or dark-frame insertion; it doesn't produce a soap-opera look (as long as you leave the Judder control off),



● The JS7000 sports a traditional flat (not curved) screen.



## THE VERDICT

**For a rewarding experience** in watching that big game or a favorite movie, Samsung's UN60JS7000 should please all but the fussy video perfectionist prepared to pay a lot more for his or her new Ultra HD set.

## HDTV

**SAMSUNG UN60JS7000FXZA LCD ULTRA HDTV**

**PRICE:** \$2,600

**Samsung • (800) 726-7864 • samsung.com**

but it does reduce the brightness significantly.

Many of the above controls are in the Advanced and Picture Options menus and are accessible only in the Standard and Movie picture modes. I did all of my testing and viewing in the Movie mode, tweaked from its default settings as needed.

### Smart Features

As with most sets today, the printed materials provided with the JS7000 are rudimentary. Samsung's more helpful 171-page (!) e-manual is available onscreen or downloadable from Samsung's Website. There are more features here than most owners are likely to use, including Smart Apps, Web browsing, links to most of the most popular streaming/downloading sites (Amazon, Netflix, YouTube, etc.), social networking, and

sharing of videos, photos, and music stored on your home network. The set can also be linked wired or wirelessly to mobile devices. I sampled material from YouTube and Amazon (wirelessly) and had no issues, apart from the fact that YouTube's "HD" is marginal HD at best, at least from my Internet provider and at this screen size. Still, I watched the entire Notre Dame/USC game on YouTube (a few days after the live broadcast) with no buffering (and no commercials—the game was about an hour shorter without them!).

Unlike some of Samsung's more upscale models, the JS7000 has only a standard remote; there's no voice or motion activation available here. That's fine with me, and the remote's backlighting helped me find the right buttons in the dark.

### Performance in SD and HD

The Samsung performed reasonably well on our standard video tests, which include upconversion (in this case, from 480i, 1080i, and 1080p to 4K). It failed 3:2 SD upconversion and was borderline (with the resolution lines barely visible) on the highest burst of our HD chroma resolution. The set passed a series of native 4K test patterns with no difficulty.

There are several audio modes on the set, and they sound distinctly different. You can choose the one you like best, though all of them offer compressed sound with little bass, dim highs, and only modest volume. But that's typical of most flat-screen sets today, and it's listenable on noncritical material (news, sports, etc.). The set's optical digital output provides full

multichannel audio from Dolby Digital sources, but only two channels from DTS soundtracks delivered to its HDMI inputs.

I spent many hours watching the Samsung before I performed a full color calibration. In Movie mode, with some significant tweaks (Backlight 17, Contrast 67, Brightness 45, Color 45, Gamma -2 or -3, and Digital Clean View, Auto Motion Plus, and all noise reduction off, with the other controls in their Off or default positions), it produced excellent results in most respects from native 720p, 1080i, and 1080p sources (the first two primarily from cable, the last from Blu-ray). My two deviations from what might be called technically correct settings were to turn the Dynamic Contrast to Low (giving the picture a subtly more realistic "pop") and the Sharpness to 20 (a barely visible trace of white line enhancement was visible on a sharpness pattern in this setting when viewed inches from the screen). With the upconverted sources, the set's resolution was excellent, and the colors were vibrant and true, with accurate flesh tones.

During my review period, the football season and baseball playoffs were in full swing, so I watched a lot of sports on the Samsung and was always impressed by the result. I was never bothered by LCD motion lag (I'm less sensitive to it than some viewers), though the set's Auto Motion Plus did help reduce blur on native video material where the film-as-video look is irrelevant. I noticed motion blur, with Auto Motion Plus off, mainly on test material specifically produced to show it.

However, two issues, not uncommon in relatively affordable LCD sets, did intrude. First, off-axis viewing was compromised, with subtle fading of the image apparent at small off-center angles but progressing to clearly visible as I reached roughly 20 degrees to the side. Also, black levels weren't up to the average we've seen from Samsung's sets recently. This was most obvious in the black bars of letterboxed movies. When the image they flanked was bright, the bars appeared to darken a bit (though this



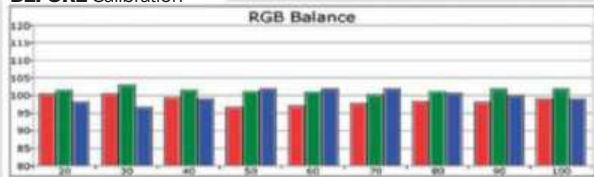
● **The ultra-thin bezel frame is sleek and unobtrusive.**

## TEST REPORT

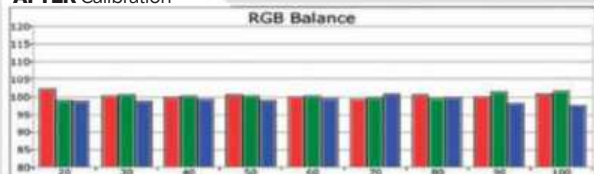
# Test Bench

Samsung UN60JS7000FXZA LCD Ultra HDTV

### BEFORE Calibration



### AFTER Calibration



**MEASUREMENTS** here were made using CalMAN measurement software from SpectraCal, together with Photo Research PR-650 and Klein K-10A color meters, a VideoForge pattern generator from AVFoundry, and (for 4K patterns) a DVDO AVLab TPG. For the picture settings used in this review, go to [soundandvision.com](http://soundandvision.com).

**FULL-ON/FULL-OFF** Contrast Ratio: Unmeasurable

**THE** set was calibrated in the Movie Picture Mode, in the Warm2 Color Tone (Samsung's name for color temperature). All calibrations were performed on upconverted 1080p patterns, using the Rec. 709 standard—the standard used on virtually all program material available today. While we'll see a wider color gamut in UHD material soon, at present it's not a factor.

**THE** unmeasurable full-on/full-off contrast ratio above was only the case when the black level was measured with a full black screen, when the backlighting closes down almost completely. Add even the smallest spot of light, however, and the entire screen gets brighter. With only the pause bug from our Oppo BDP-105D Blu-ray player displayed in the corner of an otherwise black image, for example, the full-on/full-off contrast ratio (measured at center screen) was a relatively poor 1,608:1—peak white 38.75 foot-lamberts, black 0.024 ft-L. (As a comparison, the measured black level on some of the best but no longer available plasma sets was often 0.001 ft-L or even slightly less—almost 25 times better.)

**THE** set's pre-calibration grayscale Delta E values averaged a very good 1.63, at a peak white level of 36.1 ft-L. The highest Delta E values were 2.72 at 100% and 2.44 at 90%. No other level exceeded 1.79. After calibration, using both the 2-point and 10-point White Balance controls (they can be used in tandem), the grayscale Delta E averaged 0.97, with a maximum of 3.21 at 100% and 2.14 at 90%. At all other levels, the maximum post-calibration Delta E was 0.68. The 10-point controls for 80% and 90% had little or no effect.

I also discovered that all of the 10-step controls were off by one level. For example, to calibrate at the 50% level, I had to set the adjustment menu to 40%. Weird, but I recall seeing this bug on a Samsung set under review several years ago. Apparently, it's back. (The improvements from using the 2-point adjustments alone were satisfying in themselves; the visible improvements from the more tedious to use 10-point controls were small. But we have no way of knowing if this will be true with every sample as it comes off the production line.)

**DELTA E** is a figure of merit indicating how closely a display adheres to the Rec. 709 HD color standard. Experts generally agree that at levels below 3 to 4, the result is visibly indistinguishable from perfect color tracking. A Delta E may be used to characterize either white balance (grayscale), as above, or color, as below.

**PRE-CALIBRATION**, using the Custom Color Space in its default settings, the color gamut's Delta Es averaged a solid 2.25. After calibration, they averaged 0.83, with red, at 3.64, the only value over 0.83.

**WITH** the Gamma control on -2, the post-calibration gamma averaged 2.37, with a high of 2.42 at 30% and a low of 2.35 at 60%.—TJN

## SPECS

**Dimensions (WxHxD, inches):** 53.7 x 31.1 x 2.5 (without stand); 53.7 x 33.7 x 14.5 (with stand) • **Weight (Pounds):** 48.1 (without stand); 52.7 (with stand) • **Video Inputs:** HDMI (4), component (1, shared), composite video (1, shared), antenna • **Other:** EX-Link, USB (3), STB/DVI on HDMI 1, MHL on HDMI 2, Audio Return Channel (ARC) on HDMI 3 • **Audio Outputs:** Digital optical, L/R audio analog (on minijack)



● Four HDMI 2.0a and three USB inputs are on board.

2, for example, particularly towards the end) were more grayish than you'll see on sets with the best black levels. Nonetheless, it's probably true that viewers who haven't seen a set with state-of-the-art blacks (the best plasmas of the past, upscale LED/LCD sets with the best local dimming such as Samsung's own JS9500s, and OLEDs) are unlikely to be troubled by this.

Following a good calibration (less tedious than on most sets, thanks to Samsung's ergonomically excellent CMS), these negatives were unchanged, but the plusses were enhanced. Not in a major way; as noted earlier, the JS7000 was well set up out of the box following some basic

effect was largely due to the eyes' pupils closing down). On medium bright images and especially on dark ones, however, the bars were impossible to ignore. In addition, the backlighting wasn't uniform. This rarely intruded on most full-screen material, but when the source faded to full black, and before the full screen dimming darkened the image (which took about a second), I could clearly see cloudy gray areas of varying brightness.

Apart from the visible black bars and this occasionally visible non-uniformity, however, typical dark images with bright highlights (such as the climactic dino-a-dino battle in *Jurassic World*) had respectable contrast. But difficult dark scenes, with low internal contrast and few or no highlights (many of the darkest scenes in *Harry Potter* and *The Deathly Hallows: Part*

tweaks. But the calibration improvements, while subtle, were worthwhile. The already stunningly (but naturally) sharp *Oblivion* looked as high in resolution as it had been before calibration, but the fleshtones were pleasingly warmer. The brilliant costumes in *Cinderella* popped out. And the colors in Disney's *Aladdin*, perhaps the most vivid in the Mouse House's final decade of hand-drawn animation, were jaw-dropping.

### Ultra HD

My stable of Ultra HD material is currently limited to Sony's FMP-X10 server with 4K content (but not wider color or HDR) and two USB flash drives, one from Samsung and the other from Vizio, both with a bit of UHD material having high dynamic range and wider color.

The best of the 4K material on the Sony server looked exceptional—including the movie



● Tom liked the basic remote's backlighting.





*Chappie*, which, despite its grungy art design, looked crisp and clean. Its 4K playback, viewed on the JS7000 from about 8 feet (closer than I had viewed the 1080p material), produced a winning picture, with superb detail and color.

I next set up an A/B comparison of this 4K version of *Chappie* with the Blu-ray of the movie played back on an Oppo BDP-105D. Even after cueing them up so that I could switch between the two at the same point in the movie, the differences were subtle but not insignificant. The 4K version had a realistic smoothness (though with gobs of detail) that the Blu-ray couldn't quite equal. But without the direct A/B comparison, it was hard to find anything in the Blu-ray picture to complain about.

Next I tried the material on the Samsung USB drive (excerpts from *Exodus: Gods and Kings* and *Life of Pi*). Oddly, while this drive had worked fine on the Samsung JS9500, it was

unwatchable on the JS7000. Its color was drenched in green! The material on the Vizio drive, however, looked superb, including several minutes from *Man of Steel*. The bright highlights in this excerpt had plenty of pop—in fact, more than enough for comfortable viewing in my darkened room.

There was also another oddity that I observed. With the Samsung drive, the JS7000 switched automatically to maximum Backlight and Contrast settings. With the Vizio, these controls stayed where they were with other sources. The balance of peak white to black from the Vizio drive looked natural on the JS7000; the higher settings from the Samsung drive were far too bright.

Samsung later explained that a firmware glitch (which has now been corrected) was causing the JS7000, upon recognizing the HDR metadata in my Samsung-supplied flash drive, to port my calibrated Rec. 709 color values into the set's wider "Native" color space, thus creating the green

mess. The automatic resetting of the Backlight and Contrast adjustments to maximum was said to be normal behavior, however, and is the same as happens on Samsung's other HDR-compliant SUHD models. When the set recognizes HDR metadata presented in the HDR10 format, it triggers these controls "to maximize the brightness of HDR content," though they can be adjusted, Samsung said. Reverting back to standard dynamic range content restores the non-HDR settings.

The Vizio flash drive, meanwhile, which was encoded in Dolby Vision HDR, never maxed out those controls. Samsung confirmed this or other Dolby Vision content would have been seen only as having standard dynamic range; its sets can only recognize high dynamic range content in HDR10. Nonetheless, it looked great and exhibited superb highlights without the TV knowing it was HDR and applying its HDR profile. With HDR, we will certainly be living in interesting times, at least for a while.

## Conclusions

The Samsung UN60JS7000FXZA may not get as much from true UHD material having enhanced color and high dynamic range as the company's more upscale JS9500 can. But we know of no other sets in this price range that will, and source material having these features is still in relatively short supply.

My only reservations about the JS7000 are its off-axis viewing (to be fair, an issue common to most LCD designs) and its contrast on the most difficult, darkest material. But not all viewers are as fussy as we are about the latter, and it's less obvious with full-screen material under normal room lighting than with letterboxed movies viewed in a dimly lit or dark environment. More crucial, the JS7000 offers gorgeous color and crisp resolution, so engaging that only rarely (on those darkest, moody scenes) did I feel the itch to return to my reference set, the much pricier (and no longer available) 1080p Panasonic TC-65ZT60 plasma. ♦

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David Vaughn,  
Sound & Vision.com,  
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Bob Ankosko,  
Sound & Vision.com,  
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# Debutante Ball

By Daniel Kumin

## Elac Debut F5 Speaker System

**PRICE** \$1,470 as reviewed

**AS LONGTIME** S&V READERS have doubtless come to understand, I believe that cheap, as Gordon Gekko definitely did *not* say, is good. Any \$10,000 pair of loudspeakers makes me vaguely uneasy, while a \$50,000 pair leaves me ready to join the Che Guevara Brigade and start lining up oligarchs. So the arrival of a new family of cheap—err, high-value—serious loudspeakers from Elac U.S., designed by tech/lebrity engineer Andrew Jones, caused a certain amount of excitement hereabouts. (For more on Elac and Jones, see “Man on a Mission” in our “Perfect Focus” department, October 2015 or at [soundandvision.com](http://soundandvision.com).)

Briefly, then: Elac is a 90-year-old German radio/audio/appliance manufacturer with roots in sonar and early radar—about which, given the historical period, the less said probably the better. The company was last seen on these shores nearly a half-century ago as purveyor of the long-extinct Elac/Miracord turntables and record changers (little mourned by audiophiles, it must be said). Elac's re-entry into the U.S. market rides the rails of the new, value-priced loudspeaker lineup under our

### AT A GLANCE

#### + Plus

- Superb sonics, neutral tonal balance
- Decently finished, simple look
- Unapproachable value

#### - Minus

- Some off-axis center-channel tonal shift
- Audible thump on sub's auto turn-off

gaze here, the Debut series of conventional cone-and-dome models, all designed by the estimable Mr. Jones. Jones did similar service for Pioneer a few years back, and on casual visual inspection, the two lines have some things in common: fundamental design parameters, basic shapes and sizes, and a certain parallelism in pricing. Whatever is behind this, I honestly can't say: I've never met Jones, and I have no inside industry gossip, at least in this case.

Anyway, my job is to judge the speakers, not the industrial

melodrama (if any) behind them. Elac U.S. sent us pairs of the Debut lineup's flagship F5 tower and the smaller of two bookshelf models, the B5, for surround duties. Rounding out the system are the C5 center-channel speaker and the middle of

three subwoofer options, the 10-inch S10EQ. A speaker-topper for Dolby Atmos, the A4 (\$230/pair), was alas not available in time for this look.

### The Setup

Setting up the Debuts was undemanding, not least because the tower and the sub are each comfortably below the 50-pound mark that disqualifies me for work as a UPS driver. The F5 tower looks



● The 38-inch-tall F5 tower weighs in at a reasonable 32.8 pounds.





## THE VERDICT

**Elac's Debut series reintroduces** a near-forgotten brand with a design by a well-known name—Andrew Jones—and a value/performance factor to be reckoned with.

rather pedestrian with its ordinary knit-black grille in place, but with it removed (as I did for listening to the full system), the dully gleaming weave of the driver's aramid-fiber cones lent a decidedly high-tech allure. Otherwise, the Elacs are all plain black-vinyl boxes, but clearly well made (in China) with heavier drivers, higher-grade crossover components, double-ducted ports, and solid metal binding posts (singles), all rather better than I'd expect in this price bracket. (Closer inspection was foiled by the plastic trim rings around the drivers, which proved stubbornly resistant to removal.)

Interestingly, the F5s proved a bit more forgiving to proximity to the front wall than many similarly configured speakers I've auditioned. They produced reasonably even in-room bottom octaves as close as 2 feet forward—and in my usual positions, approximately 4 feet into the room, they were just about optimal. The C5 center went on my usual low stand just below my video monitor, while I placed the B5s as always on high shelves straddling the listening position, angled rearward to wash some diffused sound along the walls.

The most interesting setup story here is that of the S10EQ subwoofer, which I located in my long-established, acoustically optimum spot to the right of the RF tower. Even with just a casual level match via my pre/pro's calibration noise tone, this made a very respectable blend with the towers, but further tuning—a great deal more than from any other \$500 sub I know of—is available. Available, that is, if you're tech-savvy enough to have an iOS or Android device on the premises, since Elac offers a free app for each to access the sub's controls and auto EQ abilities. And you'd better be so equipped, because the S10EQ has no physical controls whatsoever on

its rear panel, just a power-cord socket and a reset button. (Elac also offers a 10-inch, simple-ported S10 sub, lower-powered and EQ-less for precisely half the money. But in my view, the S10EQ is more than worth the added cost; there's also a 12-inch, higher-powered S12EQ for \$700.) The app's auto EQ feature includes a step to calibrate to the iOS/Android device's actual microphone response. This displays both the measured low-frequency room response and the correction curve that the sub applies, and it appeared to work as advertised, showing a curve consistent with what I've seen from other room-correction systems. (Of course, if your A/V receiver or pre/pro already incorporates Audyssey or a similarly competent room-correction system, this feature may be superfluous; on the other hand, it gives another option for comparison.)

## The Sounds

This is one case where I'm not going to bury the lede: These are extraordinarily good loudspeakers. Extraordinarily good even at twice the price, and still highly competitive at three times. If my long-term monitors were still made today, they'd likely sell for about 10 times the F5 towers' cost, but the Elacs matched them extremely closely, not only in tonal balance and range but also in clarity and dimensionality. As heard with an old favorite reference CD like Phil Woods' *Here's to My Lady* (Chesky), my own speakers showed a very slight advantage in upper-octaves airiness on things like ride-cymbal sheen and snare-attack leading edge; otherwise, there was basically zero advantage either way. The F5s went

## SPEAKER SYSTEM

### ELAC DEBUT F5 SPEAKER SYSTEM

**PRICE:** \$1,470 (F5, \$560 pr; C5, \$180; B5, \$230 pr; S10EQ, \$500)

Elac • elac.us



plenty low on their own, subwoofer-less, for satisfying listening on most music, including full orchestra; in my room, at a guess, their useful limit was around 40 hertz. But with the sub dialed in via Elac's app on my iPad mini, nearly the full deeper octave appeared on tap, with virtually undetectable change in bass character or smoothness, suggesting that the app does its job quite effectively (and that the sub was engineered with blending as well as raw output in mind).

The C5 center-channel speaker made a very close tonal match to the towers, differing only in what I heard as noticeably less heft in the male-voice octaves, though most female announcers were virtually indistinguishable when switching between mono (the C5) and stereo (the F5 pair). And even this difference

could be mitigated, somewhat, by fiddling with center-channel crossover frequency and sub level, though this tended to result in an overall sub volume too high for my taste. Also, like nearly all other horizontal, dual-woofer, two-way centers, the C5 displayed a fairly marked change in tonality when auditioned well off axis—say, 30 degrees or more—becoming by comparison a tad “cupped” or hollow sounding. But this shouldn't prove a problem in typical three-across seating, unless the sofa is very close to the screen.

All told, the Elac suite produced terrifically impressive multichannel sound. Tom Petty and the Heartbreakers' *Mojo* on Blu-ray Audio, a fine surround mix if not a great album, was beautifully smooth yet crisp. The DTS-HD Master Audio

track delivered an excitingly in-room impact from snare hits and power-chord stabs that most speakers in this price range simply fail to muster.

Translating this goodness to film sound was no problem for the Elacs. A recent Blu-ray arrival, the Brad Peyton-directed thrill ride *San Andreas*, produced all the mayhem and madness any home theater buff could



● **Elac's aramid drivers feature an attractive weave.**

## TEST REPORT



● **There are no controls on the S10EQ sub's back panel. Control is via iOS/Android app.**

desire. The Debut suite created a solidly integrated front stage, so that elements like laterally flying helicopters and racing Town Cars held together seamlessly, with smooth pans and a convincing sense of depth, while the SE10EQ did yeoman's work with the deep bass (and even infra-bass) of the temblors. And that's just chapter 4.

The B5 bookshelf-sized two-ways worked competently in the surround positions, adding a decent bubble of surround ambience—not as enveloping as what I hear from my everyday dipole surrounds, but quite acceptable, as I find to be the case



● **A circular indentation graces the S10EQ's grille.**

## RATING

**Elac S10EQ Subwoofer**  
Performance ★★★★★  
Features ★★★★★  
Build Quality ★★★★★  
Value ★★★★★

from most smaller two-ways. (Dipoles seem to have fallen out of favor, generally, in surround speaker families. Why?) These smaller of the two bookshelf Debut models, by the way, made a fairly close match to the F5 towers in direct comparisons, but the three-way towers displayed a definite advantage in midrange transparency and image depth.

Any film with an earthquake and a Rock (Dwayne Johnson) as its marquee attractions is certain to serve up some suitable subwoofer stressors, and *San Andreas* did not disappoint. (If you collect Blu-rays to show off your system, add this one to your list.) Nor did Elac's compact but effective S10EQ. With plenty of bottom-octave impact and a

welcome dearth of second- to third-octave boom, the surprisingly small sub left very little to be desired up to about 6 decibels shy of "reference" level in my studio—which, conveniently, is about the upper reach of my for-pleasure listening demands. Pushing further caused the Elac to go a tiny bit flabby and "clacky," and the last half-octave of (ahem!) seismic infra-bass was lacking in authority, but hey—this is a \$500 sub. With auto EQ! (And a couple of bills more would buy the larger and likely louder S12EQ.)

### So the Winner Is...

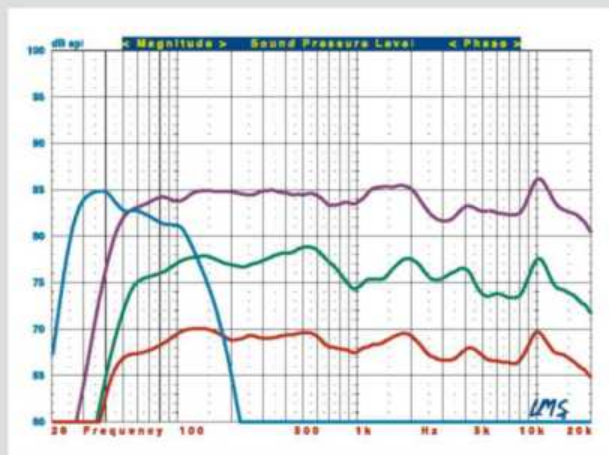
You. Me. Us. The bottom line is obvious: Elac's Debut—uh, debut—is a flag-waving success. One could draw numerous conclusions here; mine is that dogged conventional-driver engineering, careful tonal balancing, and an expert designer's ear still trump exotic materials and "all-new" driver technologies, at least where cost/performance is king. Any speaker shoppers as careful of their dimes as their dollars—and not insistent upon rounded corners,



See [soundandvisionmag.com](http://soundandvisionmag.com) for full lab results and technical definitions

## Test Bench

### Elac Debut F5 Speaker System



**F5 (purple)** +1.54/−2.90 dB, 200 Hz to 10 kHz; −3 dB @ 48 Hz, −6 dB @ 42 Hz; impedance minimum 5.70 ohms @ 99 Hz, phase angle −43.51° @ 41 Hz; sensitivity 84.5 dB, 500 Hz to 2 kHz.

**C5 (green)** +1.83/−3.67 dB, 200 Hz to 10 kHz; −3 dB @ 55 Hz, −6 dB @ 48 Hz; impedance minimum 5.04 ohms @ 186 Hz, phase angle −62.72° @ 98 Hz; sensitivity 88 dB, 500 Hz to 2 kHz.

**B5 (red)** +1.19/−2.24 dB, 200 Hz to 10 kHz; −3 dB @ 52 Hz, −6 dB @ 44 Hz; impedance minimum 6.04 ohms @ 186 Hz, phase angle −52.11° @ 98 Hz; sensitivity 84.5 dB, 500 Hz to 2 kHz.

**S10EQ (blue)** Close-miked response, normalized to level @ 80 Hz: lower −3 dB @ 25 Hz, −6 dB @ 23 Hz, upper −3 dB @ 123 Hz when reset to factory default.—*MJP*

## SPECS

**F5:** 5.25 in aramid fiber woofer (2), 5.25 in aramid fiber midrange, 1 in cloth-dome tweeter; 7.87 x 38 x 8.75 in (WxHxD), 32.8 lb • **C5:** 5.25 in aramid fiber woofer (2), 1 in cloth-dome tweeter; 18.75 x 7.87 x 8.75 in (WxHxD), 18 lb • **B5:** 5.25 in aramid fiber woofer, 1 in cloth-dome tweeter; 7.87 x 12.75 x 8.75 in (WxHxD), 11.5 lb • **S10EQ:** 10 in doped-paper-cone woofer, 10 in doped-paper-cone passive radiator; 200-watt RMS (400-watt peak) BASH amplifier; 13.5 x 13.5 x 13.5 in (WxHxD), 31 lb; line input (RCA-in. jack), IEC power-cord socket, reset pushbutton, auto-on/off. Volume, crossover, phase, delay, single-band parametric EQ, and auto EQ controls and features accessible only via iOS/Android apps.

real-wood veneers, or high-tech innovations—must audition the Elac Debut speakers. Their performance is impressive even without reference to price, while their

value rating is off the charts, and even right off the paper. Highly recommended. ♦



## Elac's Debut is a flag-waving success.





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Bowers & Wilkins

# Ultra Ultra

By Thomas J. Norton

## Vizio Reference RS120-B3 LCD Ultra HDTV

**PRICE \$130,000**

**IN EARLY** OCTOBER, VIZIO INVITED me to New York City to join other digital-stained A/V scribes in the official launch of the company's new Reference series Ultra HDTVs. The featured attraction was the RS120-B3 (\$130,000), loaded up with more than 8 million pixels on its 120-inch-diagonal (10-foot!) screen. The considerably more affordable, 65-inch RS65-B2 (\$6,000) joined in the festivities.

Before the introduction, Vizio hosted a briefing for television reviewers to explain the technology and offer tips and tools for evaluating and calibrating high dynamic range (HDR) sets. Later, a handful of reviewers were granted some brief private time with the big RS120-B3 to do our best to wring it out. Although editor-in-chief Rob Sabin and I had only a bit more than 90 minutes with the set, it allowed us to make some observations in anticipation of a full review of the 65-inch version, which we hope to bring to you soon.

The converted factory that functioned as the event venue was likely chosen because the freight elevator was big enough to transport two RS120-B3s (at roughly 350 pounds each) to the third- and fourth-floor exhibit spaces. That open-ceiling elevator, which I'm guessing was at least 20 feet by 10 feet, could probably lift a Humvee without breaking a sweat.

### Briefing Day

Both the RS120-B3 and the RS65-B2 are said to include all of the features needed to take full advantage of enhanced Ultra HD content, for which 4K resolution (3840 x 2160) is just the start. Equally or perhaps even more important are deeper, expanded color and HDR. Vizio's Reference series TVs are the first

**AT A GLANCE**

+

**Plus**

- **Bright!**
- **Good blacks**
- **Respectable out-of-box calibration**

-

**Minus**

- **Clips above white and below black**
- **No 3D**
- **Expensive!**

sets to incorporate the Dolby Vision HDR format in a commercial design, though a few other sets currently on the market can accept Dolby Vision sources and convert them to the HDR format they're equipped to use. Dolby Vision is one of several HDR formats, and while Dolby arguably initiated the race to HDR, the format that may see the widest commercial use is the less demanding HDR10 standard settled on as a baseline by the CEA. (For more on HDR, see "The New TV Tech," page 34.)

In LCD TVs, achieving high dynamic range—which offers brighter highlights closer to what we experience in real life—strongly demands full-array backlighting with local dimming. Although manufacturers claim they deliver HDR with edge-lit backlights, the greater degree of control over small areas of the screen afforded by a full-array backlight greatly enhances the execution. Those who do offer full-array local-dimming sets rarely specify how many zones those backlights have. The most zones we'd seen to date were the 336 in the now discontinued Sharp Elite PRO-70X5FD of four years ago. On the other hand, both of the Vizio Reference models boast 384 locally

dimmed zones of LED backlighting, which translates to about 21,000 pixels per zone—not bad for a screen with 8.3 million pixels total.

The peak light output of the Reference sets is said to be 800 nits, or about 233 foot-lamberts—roughly 2.5 times as bright as most 1080p, LED-lit LCD HDTVs can manage. But by definition, this peak brightness isn't used at all times and in all scenes; it's called into play to produce those brighter, more real-life highlights—the calling cards of HDR. Most current HD sources are produced (graded) for a maximum brightness of about 100 nits, or 29 ft-L, though film and production video is capable of much higher dynamic range. This lower-level grading, which originated in the CRT era, is

why I typically calibrate and watch a set at no more than 35 ft-L. Cranking the brightness higher—as most showrooms, home viewers, and even critical viewers do for bright-room viewing—may be pleasing, but it doesn't accurately mirror the way the source was created.

Our current HDTVs, and virtually all HD programs, also produce far fewer colors than our eyes can see, particularly in the areas of red and green. But the Vizio UHD sets are capable of a wider color gamut, along with conveying 10-bit color from the source to the screen. Assuming they're fed appropriately mastered UHD program material, this will more closely approach the visible color spectrum. The RS65-B2 employs a quantum dot panel in its backlighting to produce this wider color. The RS120-B3 sticks to more traditional LED backlighting, but is said to use a combination of red and green phosphors with blue LEDs to achieve



● **The Vizio Reference models' LED backlighting uses 384 locally dimmed zones.**



## THE VERDICT

If you want a *really* big screen that's more than bright enough for a well-lit room, and you have a bank account that's flush enough (or a very understanding loan officer), this 120-inch Vizio incorporates all the bells and whistles.

## HDTV

### VIZIO REFERENCE RS120-B3 LCD ULTRA HDTV

PRICE: \$130,000

Vizio • (888) 849-4623 • vizio.com

the wider gamut, with only a small sacrifice in performance; the technology to produce quantum dot backlighting in so large a set is not yet available.

Calibrating a set with HDR and wider color capabilities presents new challenges that were covered in Vizio's technology seminar. Much of the briefing discussed how to set things up to take full advantage of the enhanced resolution, color, and dynamic range. To achieve this, a special Dolby Vision workflow was added recently by SpectraCal to its widely used CalMAN 5 calibration software. We're told that SpectraCal is working on additional workflows to accommodate the different emerging HDR standards.

### Working It Out

Given that our quality time alone with the RS120-B3 was limited to 90 minutes, what you'll read here is *not* a full, in-depth review. Rather, it falls somewhere between a canned manufacturer demo and the sort of detailed hands-on evaluation we do

for our usual video reviews—and much closer to the former than the latter. A calibration alone, for example, can take me two to four hours—and on some sets longer, particularly if the calibration needs to be done more than once, as is often the case. Consider me either very slow or very thorough! A full calibration was therefore impossible here, as we wanted to divide our limited time between testing the TV and watching familiar material (both UHD and upconverted Blu-ray). So that's why you don't see a Test Bench section here, or any of our usual star ratings. These should be considered top-line, off-the-cuff (albeit expert) observations—nothing more. It's unlikely we'll ever do a more extensive review of this particular set, given its size and price, but as noted above, we do hope to have a thorough look at its little brother, the RS65-B2, as soon as possible.

Our technical measurements were done with a DVDO 4K generator. Out of the box, in the Calibrated Dark mode, the grayscale (measured by



an X-Rite i1Pro color meter) was acceptably close to the 1080p Rec. 709 standard, with grayscale Delta Es mostly under 3.0—which means that further improvement is likely to be invisible to the eye. We had begun in the Standard mode, however, which was alarmingly worse. But any buyer of this \$130,000 set has a right to expect that in addition to delivery and setup, his or her dealer (or Vizio technicians) will either perform a thorough calibration or arrange for

one to be done as part of the purchase price.

Even in the Calibrated Dark mode, the default brightness was far too high, at about 77 ft-L. I backed off on the backlight setting from 37 to 12, which offered a far more comfortable dark-room viewing experience. The 2.2 gamma setting was also off a bit (a common error in many sets), producing an average gamma of just under 2.0. We changed to a setting of 2.4 for most of our actual viewing, which measured closer to 2.2.

While we didn't have time to perform a contrast measurement in the room (which was fairly dark but not as "can't see your hands in front of your face" black as I would prefer), my favorite dark scenes from *Harry Potter and the Deathly Hallows: Part 2* looked very good, if not *quite* as impressive as on, say, my home reference Panasonic TC-65ZT60 plasma—a hurdle that nothing short of an OLED or a smaller full-array local-dimming set has yet consistently exceeded.

A quick test revealed that the Vizio clips video below black and above white. I've complained about this before with other products, and while it has little effect on normal program material, it can make it more difficult to set the black level (the brightness control) correctly and will clip any white program material that goes above the standard video white level (no content is supposed to, but it can happen on bright scenes or highlights, and if it does, you'll lose detail in the whites). This isn't a deal-breaker, but offenders in this regard (and Vizio isn't the only one)



● The RS120-B3 can easily replace a projection screen.

## SPECS

**Dimensions (WxHxD, inches):** 106.92 x 61.15 x 3.7 • **Weight (Pounds):** 385.8 (with stand) • **Video Inputs:** HDMI 1.4 (4, 2 with HDCP 2.2), HDMI 2.0 (1, with HDCP 2.2), component video (1), composite video (1) • **Audio Outputs:** Analog audio (1), digital audio (1) • **Other:** Ethernet port (1), USB (1) • **Audio Return Channel:** Avia-compatible on HDMI 1

might want to take another look at their firmware.

We couldn't test HDR material on the RS120-B3, as the USB thumb drive that Vizio provided wouldn't function properly on the set (though it had been working on other samples in Vizio's demo space; we later learned that a reboot of the TV set things right for the next group of reviewers). Nonetheless, Rob had brought along a Sony server containing downloaded native 4K material, and it worked fine on the Vizio. We sat about 10 to 11 feet away (an up-close cinematic perspective, to be sure), and while a short movie trailer for something called *Love Bot* may have been close to soft porn, it produced superb fleshtones and remarkable up-close detail on the Vizio—the best and most natural rendition of detail we saw from the set during the two-day event. We briefly viewed other material from the server, but nothing else came close. This proved that if the source has the detail, the Vizio has the resolution to show it. The source is, as ever, a major component of what you'll see on this or any other set. UHD sources featuring HDR encoding are still in short supply, though Vudu is getting into the game with streaming-quality content, and Netflix is joining soon. But the big banana for me will be UHD on Blu-ray, hopefully coming by early 2016.



● **Connections are located in a recessed panel on the back of the set.**

Still, for the next year or two, the bulk of what you'll watch on this or any other UHD set will be upconverted 1080p. For that, I had brought along Blu-rays of not only *Harry Potter* but also *Microcosmos* and the new live-action *Cinderella*. Both of the latter discs have remarkable resolution and color when seen on any good HDTV, and as upconverted on the Vizio, they were impressive. We did note a little softness compared with what these discs offer on a smaller screen, but how much of this was due to the Vizio's upconversion and how much simply to the size of the screen was impossible to determine in the absence of any external upconversion with which to compare the Vizio's (the older Blu-ray player we used didn't have 4K upconversion).

In the ball scene from *Cinderella*, I noticed what appeared to be some artifacts on the crystal chandeliers as they moved past the camera. But when I viewed this later on a smaller UHD set I had in house for a review, it merely looked like the shimmer you'd usually see as crystal reflects the ambient lighting. A shot of the king's red jacket, however, did show what appeared to be some false contouring in the folds of the jacket's sleeve, which wasn't visible on that smaller UHD set. But this was minor and, again, may have been due to something outside of the set itself.

## Soundbars and More

On the first day, we also toured a showcase of Vizio's other products, with of course an emphasis on UHD and HDR. The smaller Reference RS65-B2 set comes with its own cosmetically matching soundbar-and-subwoofer system, and the soundbar itself may be attached to the set or located elsewhere. While it can't duplicate what a full surround sound system can give you, it sounded very good (for a soundbar,

anyway), though the "subwoofer" didn't seem to go much below what I'd call midbass.

I attended a closed-room demo of the soundbar, and I must say that (apart from the native 4K *Love Bot* short on the RS120-B3) the picture on the RS65-B2 used for that audio demo was the most impressive I saw in the two days. The source that time was *The Art of Flight*, a beautifully shot snowboarding documentary played from a 1080p Blu-ray upconverted by the set to 4K. Of course, that disc looks spectacular wherever I've seen it, but the bright sunlight slopes and cast shadows had particularly strong impact on the RS65-B2.

Several other RS65-B2 sets were also on display, showing Dolby Vision HDR material. While they were very impressive, I would have toned down both the brightness and color (likely the default settings) for a more natural look. But the color in some of the program material—

from *Man of Steel*, *The Great Gatsby*, and *Mad Max: Fury Road*—was most certainly over the top by design (at least for the latter two). Only the cinematographers and directors of those movies could tell us if this was the look they were after. I did notice, however, that some of the CGI work (such as the flamethrowers in *Mad Max*) looked patently like...well...lower-res CGI. I can't blame the sets for calling it like it is!

## Conclusions

We didn't address some of the RS120-B3's features here, including its Internet capabilities. But be assured, they're as extensive as those in any modern UHD set. If I had \$130,000 burning a hole in my pocket, I would definitely consider the RS120-B3. It makes a statement like no set since members of the press (and a few very well-to-do customers) were treated a few years back to a limited-edition, 150-inch plasma from Panasonic, which cost \$200,000. This Vizio has an appetite that's likely more friendly to your power bills than the plasma was (though not *that* friendly). Can you get a picture this size or larger for even less? Sure, with a projector and screen. But 4K home projectors are still thin on the ground, and while they do exist, they won't produce as extreme a dynamic range as a flat-screen set can with HDR material. Nor will they be as watchable in a well-lit room. So if you want a big, bright, UHD picture with HDR, and price is no object, this Vizio may be the best game in town—for now. ♦



● **Vizio's remote features a QWERTY keyboard on its back side.**

● **Along with the huge 120-inch RS120-B3, Vizio's Reference Series includes the more attainable 65-inch RS65-B2. Both models will benefit from 18 Dolby Vision-encoded HDR movie titles rolling out from Vudu, including *The Lego Movie*.**



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# A Rose by Any Other Naim

By Fred Manteghian

## Naim Mu-so Music System

**PRICE \$1,499**

**HOW PROUD** ARE THE ENGLISH of the English? Pretty damn. It's why Bentley chose Naim for their "in-cabin" sound systems. (They don't even call it automotive sound. How cool is that?) I asked that an appropriately equipped Bentley be sent along for comparison to Naim's one-piece Mu-so music system, but alas, no review samples were currently available (or so I was told). That's OK, I'll just sit in my easy chair and use a calf's-leather-scented plug-in air freshener to re-create the ambiance while I listen to the Mu-so.

### Pardon Me, Would You Have Any Grey Poupon?

If you're an established audiophile, you'll doubtless recognize the British company Naim as a longtime purveyor of high-end two-channel products. Philosophically, Naim has always traveled the minimalist path, marching to a different drummer in their approach to both features and design. Eschewing more conventional RCA and XLR connectors that carry one channel per cable, Naim loved to use DIN connections (which paired channels with a common ground), ostensibly on sound engineering principle—but coincidentally, they also sold the cables. 'Nuff said. Today, Naim continues to offer a full line of electronics and speakers dedicated to two-channel sound, but they've upped their game with DACs, network players, and hybrid devices to create refined sound for a new generation.

The Mu-so is both as minimalist and as modern as you can get.

The Mu-so (odd Naim, er, name) is a single-box, six-speaker, two-channel, Bluetooth- and Wi-Fi-enabled music system. Under the eccentrically deformed front panel (available in Burnt Orange, Vibrant Red, and Deep Blue, if basic black isn't your thing), there are two racetrack woofers, two midrange drivers, and two tweeters, each powered with a 75-watt Class D (switching) amplifier for a claimed total of 450 watts. There are two down-firing slot-shaped ports on the left and right sides to augment the amount of bass you get from the two woofers—which, in the end, is considerable. And while Class D amplifiers aren't known for running hot (quite the opposite, actually), the entire rear of the Mu-so is one big anodized-aluminum heatsink!

The top panel is dominated by a large knob, taken directly (it seems) from Naim's uber-expensive Statement line of separates. The knob is actually a ring that surrounds a circular touchpanel, from which you can change inputs, pause and resume play, skip tracks, and power the unit on or off. The circular ring itself is infinitely rotatable as it raises and lowers the volume, and operation is as smooth to the touch as the leather in my imaginary Bentley.

Naim designed the aluminum-clad, wood-bodied Mu-so to sit on a piece of clear acrylic about an inch high, running most of its width. The effect is to make it appear that the Mu-so is floating, while allowing the bass ports on either side some space to breathe. Along the right side, there is a cut-in on the bottom for the power cord, an Ethernet connection for hardwiring your Naim to the router (as an alternate to wireless connection), and an optical digital input. The power cord is just that—a cord. Naim has wisely chosen to house the power supply in the Mu-so itself, instead of birthing yet another ugly power-supply brick on the planet.

Along the right side are the two remaining physical inputs, a USB connector and a 3.5mm analog line input. There is also a small pin-hole for access to the reset button, as well as a multicolored LED used for setup. Following instructions in the quick-start manual and using an official pin-hole tool (you can also use a paper clip), I started the wireless connectivity setup. The Naim will work with both Apple iOS devices (like iPhones or iPads) and Android devices. Using the AirPlay setup page, I instructed my iPhone to recognize a new AirPlay speaker. You don't have to struggle with getting your wireless network's name and encryption key (password) into the

### AT A GLANCE



- Powerful and dynamic
- Faithfully reproduces acoustic instruments and vocals
- Extremely well built



- Expensive, to be sure

Naim. The iOS device will whisper it to the Naim. The blinking LED on the side gives you an idea of where it is in the process. For some reason, it does take about five minutes to complete setup once you get the process going, but I got it in one attempt.

After the wireless network setup was complete, I was immediately able to access any of the music-streaming apps on my iPhone. I fired up "music" from the phone's pull-up menu, then simply selected AirPlay, then Mu-so, and my music started streaming seamlessly to the Naim system. If you switch between apps (such as jumping between Pandora and Spotify), you won't have to redirect AirPlay. But if you, say, leave your domicile and have to reconnect to your wireless network when you get home, you'll have to re-establish AirPlay by pointing to the Naim.

As mentioned, besides wirelessly streaming over your home network, you can choose to stream via Bluetooth, but I wouldn't recommend it. With a Wi-Fi connection, you have access to the Mu-so's entire volume



● Six carefully arranged drivers are housed in the ported cabinet.





## RATING

### Naim Mu-so Music System

Performance ★★★★★

Features ★★★★★

Build Quality ★★★★★

Value ★★★★★

## THE VERDICT

**Unbelievable sound quality for a one-piece music system.**

## MUSIC SYSTEM

### NAIM MU-SO MUSIC SYSTEM

PRICE: \$1,499

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range from an iPhone's side-mounted volume buttons. With Bluetooth, you can still change the volume with your phone, but your maximum volume is limited by where the Naim's big knob was last set. Another downside of Bluetooth: If you wander 20 or so feet away, the music goes off. Great way to announce to your party guests that you're off to the loo.

### The World at Your Fingertips

One feature that I didn't get to use was Universal Plug and Play (UPnP), which would have allowed me to stream my music library in iTunes on my iMac to the Naim. To do so would have required installing third-party software on my iMac, which has other duties I couldn't risk compromising. I also didn't get to try the recently added multiroom feature because, of course, I only had one Mu-so. But let's be honest: Most people will want to stream music wirelessly right from their phone. That's why Mu-so is sold in "select" Apple stores and will no doubt be a hit with the financially elastic crowd.

The Naim Mu-so has a built-in Internet radio receiver. It can access the Internet via the wireless network or, if you're close enough, hardwired via its Ethernet connection in the base. You'll want to download the Naim app first, and once you've selected your specific Mu-so, you can peruse the world with your fingertips. The app's display tells you both the sampling rate and the bitstream rate of the selected station. Most stations offer abysmal audio—128 kilobits per second is the lowest I'll listen to—but Naim also includes two presets that

get you to some 320-kbps stations that sounded very natural to me. Strangely, you can't control the volume of Internet radio from the same buttons on your phone you use to control streaming music, but you get a volume bar along the bottom of the app that you can use to adjust the volume.

The Internet radio includes a search function, so if your favorite stations aren't listed, you can find them that way. If you'd rather search regionally and then by Genre, you can do that instead. For instance, you can pick North America, California, College, and University of California, Berkeley. By the way, it's 7 o'clock on a Saturday morning in Berkeley as I sit across the country on the East Coast and listen in on some hipster's early show. As my wife Gina says, "You realize you're his only listener?"

### Stream Away

Naim has also announced support for Tidal, an Internet streaming service that provides very high-quality audio, but it wasn't available in time for my review. Still, I signed up for a free trial of the lossless package and was able to stream it just like Spotify and Pandora, using AirPlay. At \$26 a month after the free trial, Naim's lossless audio streaming plan is a bit rich, but shortly into my review period, I decided the Mu-so would justify the expense.

Here's a word on placement. I initially put the Naim in my home theater in approximately the same position usually reserved for my center-channel speaker. The tweeters were significantly below ear level, and the sound suffered for it. I moved it to

the seating area outside my newly remodeled kitchen, putting it on a granite desktop, which brought the tweeters to within an inch of my ear height. From about 12 feet away, the sound was quite rich and detailed, and the bass tightened up nicely.

First up on Tidal was my second favorite Genesis album, *Selling England by the Pound*. (Right behind my favorite, *Foxtrot*.) I cranked it up almost all the way during "Firth of Fifth" and was treated to some lovely Mike Rutherford bass lines. As the song evolves, the instruments go from synth-heavy rock to pastoral strings and back again. The Mu-so was more than capable of filling the room; 450 watts will help with that. But more important, the music played without obvious distortion, even at very high levels. I will admit that, at the highest levels, the sound did compress slightly, with cymbals edging on brittle or, at the very least, hard, but that's to be expected. Bass remained firmly under control, however, as the Mu-so provided ample representation of low frequencies. I didn't get the full-body impact from Rutherford's Rickenbacker that I know this track is capable of producing, but I clearly heard and substantially felt all his sustained bass notes. Higher up the frequency ladder, Steve Hackett's incredible guitar solo on this song was as soaring as anything I've heard from dedicated two-channel systems.

Everyone's favorite Miles Davis album, *Kind of Blue*, is available in a lossless stream from Tidal. "So What," you say? Exactly. The track came off great; the hiss of the master tape was



● A large, circular touch-panel and volume ring dominate the Mu-so's top panel.

clearly audible in the opening section, but it quickly became mostly buried when the band went full-tilt boogie. Miles' trumpet was ethereal as always, his notes smoothly sliding into each other, with micro-variances in note volume easily discernible. One thing the Mu-so got right was that, even at low volume levels, it had a naturalness that worked so well with all kinds of music. For the most part, there was tight bass (as well as sparkling high frequencies) at any listening level. Still, I was trying hard to analyze when the Mu-so just wanted me to get into the groove.

The two-decade-old recording of Handel's *Water Music* by the Academy of St. Martin-in-the-Fields (with Neville Marriner conducting) was a good test of the Naim's dynamic range and honesty. The inherent honky-ness of myriad French and English horns was on



● The Mu-so appears to float on its wide clear acrylic base.

## TEST REPORT

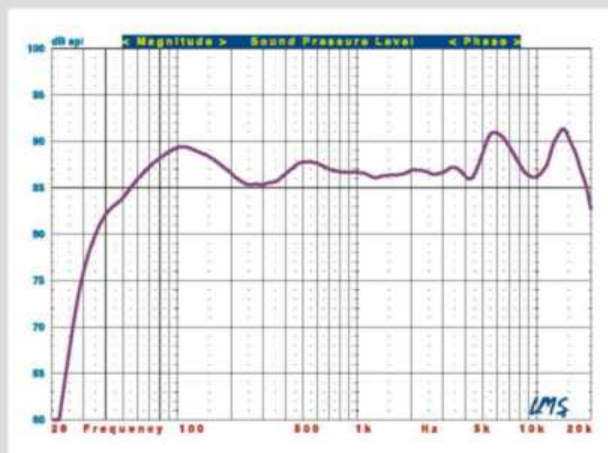
● The Mu-so features a built-in Internet radio receiver.



See [soundandvisionmag.com](http://soundandvisionmag.com) for full lab results and technical definitions

## Test Bench

### Naim Mu-so Music System



**MU-SO (purple)** + 3.95 / -1.76 dB, 200 Hz to 10 kHz; -3 dB @ 50 Hz, -6 dB @ 37 Hz.—MJP

**SPECS** 5.25 x 2.75 in paper cone woofer (2), 2.5 in paper cone midrange (2), 1 in silk dome tweeter (2) • **Dimensions (WxHxD, inches):** 24.75 x 4.75 x 10 • **Weight (Pounds):** 29 • **Frequency Range:** Not specified • **Rated Power:** 450 watts • **Enclosure Type:** Vented • **Connections:** L3.5mm analog, USB, optical digital, Ethernet, Wi-Fi, Bluetooth

display without any compression. At the loudest levels, some induced resonance became apparent, but it wasn't offensive. The sometimes sharper, sometimes more delicate nature of the period instruments used by the Academy (usually referred to as "original instrumentation") is best demonstrated by the string section. It's quite brighter and livelier than modern instrumentation while being just as seductive. The Naim Mu-so did much better with the strings than with the horns, projecting their full range and never coming close to losing their sweetness.

When I switched to another recording by the group, "Dance of the Hours" from Ponchielli's *La Gioconda* (whose melody will instantly be recognized from Allan Sherman's "Hello Muddah, Hello Fadduh"), the Mu-so demonstrated the finest depth of the soundstage it could muster. The harp had body, with its gut strings sounding warmer, projecting a meatier flavor and forwardness. The plucked string section and glistening violin leads created a nice layering of sounds. The acoustic of the chamber where this was recorded



was easily heard without being compromised by smearing.

### Magic Tricks

As with all devices that work without wires, sometimes magic tricks are required to make everything behave. In the case of the Naim Mu-so, I'd have to say that any problems I ran into fell to the feet of the Naim app or my home network, not the Mu-so itself. One time after listening to Naim's iRadio, I had difficulty streaming music to it from Tidal. Like any iPhone user, I dutifully started closing apps

and reconnected to the wireless network—and even then, halfway through a song, I lost the connection. The Naim app now showed iRadio (Internet radio) was playing, but I couldn't hear it. A bit more fiddling, and it roared to life, and while I quickly tried to scroll down the volume, the Mu-so didn't respond. Finally, I did what every computer user would do: I

unplugged and replugged the Mu-so! That fixed everything. So is it perfect? No, but as a species, we are equipped to handle it, and Naim's challenges are decidedly of the garden variety.

Why would you want to spend \$1,500 for a glorified boombox? The Mu-so is by far the best-sounding device of its type I've encountered, filling the room with music at a level that is very satisfying for all but metalheads. It reproduces recordings very neutrally and, with the best sources, will reveal the ambient acoustic of each recording.

But filling a room is different from re-creating the sound of the recording venue. The Mu-so will artfully reveal the acoustics of the venue, but it can't re-create the venue itself. That is still under the purview of a well-designed two-channel audio system. When your left- and right-channel tweeters are only slightly more than a foot apart, the music can't be anything other than centered. That said, the Mu-so exceeded my expectations in its ability to convincingly suggest depth in the soundstage, within its limits. The fact that I'm even introducing the concepts of soundstage depth and width in a review of a music brick should be praise enough. The Naim Mu-so is highly recommended, if you've got the scratch! ♦



● The Mu-so app works with iOS and Android devices.

● Optional cabinet finishes are also available.

**The Mu-so exceeded my expectations.**



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# Entertainment Reviews in High Definition



BLU-RAY 3D

Avengers: Age of Ultron



## How the Mighty Have Fallen



Sequels can be a tough nut. *Age of Ultron* is of course the follow-up to 2012's *The Avengers*, but along the way, there were four other Marvel Universe movies that apparently need to be acknowledged here, coupled with the laborious task of tying in TV series and setting up movies yet to come. Throw in too many characters and some extraneous subplots, and the result is a sequel more exhausting than entertaining.

When a vital artifact from *The Avengers* is finally retrieved, billionaire genius Tony Stark (Robert Downey Jr.) uses it to create his greatest weapon yet: artificial intelligence that can ultimately protect the entire planet. Seemingly endless and utterly pointless “folly of man” debates ensue—Stark has already released the evil genie named Ultron from the bottle—giving this new techno-villain the chance it needs to run rampant. Earth's mightiest heroes reassemble to pursue Ultron, but their efforts are hindered by a foe with mind-control powers (again? *really?*) and, frankly, a fair amount of whining in the



**BLU-RAY 3D**  
STUDIO: Disney, 2015  
ASPECT RATIO: 2.40:1  
AUDIO FORMAT: DTS-HD Master Audio 7.1  
LENGTH: 141 mins.  
MPAA RATING: PG-13  
DIRECTOR: Joss Whedon  
STARRING: Robert Downey Jr., Chris Hemsworth, Mark Ruffalo



ranks about leaving Avenging behind for good. Writer/director Joss Whedon is known for colorful characters that interact well, and while he might have stumbled on that front, with *Age of Ultron* he has at least proven beyond any doubt that he also excels at complex, large-scale cinematic action. So let's hold onto that.

The 2.4:1 image displays a surprising amount of diffusion, which is not a problem per se, but it does not always yield visual “wow.” Various textures are finely rendered, and the comic-book colors are pleasingly bright, while other distinct palettes conjure specific moods, such as the warmth of a rural homestead at dusk. The movie was captured digitally, but except for a few shots with mild video streaking, it has a

### RATINGS

	Poor	Fair	Good	Excellent	Reference
PICTURE	★	★	★	★	★
3D-NESS	★	★	★	★	★
SOUND	★	★	★	★	★
EXTRAS	★	★	★	★	★

convincingly filmic look. Disney was kind enough to send the two-disc Collector's Edition, which includes a Blu-ray 3D. The movie was converted from 2D, but the ubiquitous CGI elements work wonderfully within the stereoscopic illusion, often looking as though they are truly floating in the air before us. The exquisite levels of focus in turn seem to reveal greater detail in this version, plus a palpable sense of depth even in the more mundane scenes.

The DTS-HD Master Audio 7.1 soundtrack, meanwhile, begs to be turned up above our typical listening levels to be properly appreciated. Where else can we hear the might of Thor's hammer, a full-on Hulk rampage, the sharp repulsors and thrusters of Iron Man, the whiz of Hawkeye's arrows, and the clang of Cap's shield in a single movie? Specific effects are precisely localized at times—a chunk of debris, an alarm bell, a gunshot—and the different channels work in thrilling harmony during the busier, 360-degree action sequences. Even a quick, tense moment of Hulk jumping onto a car with us inside is realistically re-created, although bass lacks real room-shaking power. However, the much-talked-about Hulk-vs.-Hulkbuster battle noticeably benefits from the keen sonic beats in the track.

Whedon adds an often-enjoyable running audio commentary, along with four deleted scenes, a gag reel, and three featurettes, one of which explores the increasingly important Infinity Stones. All of these extras appear on the 2D Blu-ray only. This pack also includes a multi-platform Disney Movies Anywhere Digital HD Copy.

The *Age of Ultron* has passed. A *Civil War* lies ahead. **Chris Chiarella**

soundandvision.com

**The city is flying, we're fighting an army of robots, and I have a bow and arrow.**





## JURASSIC WORLD

### BAD DINOSAUR!

Universal



If Disneyland once got sued because (it was alleged) Winnie the Pooh had accidentally slapped a young guest while posing for photos, it boggles the mind to contemplate all the lawsuits *Jurassic World* would have incurred after the devastation depicted in this film.

In the 22 years and three films since *Jurassic Park* re-introduced living dinosaurs to the world, there has been rampant chaos, carnage, and death at every turn. Still, it seems the harsh lessons of playing God and tampering with Mother Nature have gone completely unheeded yet again. Lo and behold, another attempt at a state-of-the-art theme-park zoo of cloned dinosaurs has made its debut for the paying public: *Jurassic World* is now open for business, and the park is packed with 22,000 eager tourists. But this time, all the bugs are worked out, and the past mistakes have been corrected. What could possibly go wrong?

The 3D version of *Jurassic World* was my preferred viewing choice out of the gate, but there's still room for improvement. There's excellent depth of field and clarity, with sharp delineation between background and foreground elements, but some rapid camera movements give rise to intermittent motion blur and minimal ghosting effects. Nitpicking aside, this is still an impressive 3D transfer.

The 2D version is superlative on all fronts as well; the image is clear and vibrant in both interiors and exteriors with only the minutest compression issues. Fleshtones and jungle foliage are consistently even, and the live-action imagery seamlessly blends with the ever-present CGI effects. The 7.1 DTS-HD Master Audio track boasts a truly immersive auditory experience. Predictably, when the dinos are perpetuating their unbridled carnage and terror, the audio is at its most exhilarating, but subtler moments of background ambience also entice the senses.

Extras include deleted scenes, a one-on-one Q&A with Chris Pratt and director Colin Trevorrow, and five in-depth featurettes that detail the intricacies of making the film. DVD and Digital Copy are included.

If you've been to Universal Studios or Sea World, *Jurassic World* will seem innately familiar. Something of a hybrid, the movie borrows elements from its previous incarnations to create a slicker, more advanced version of itself and succeeds on multiple levels. It's a tour de force of home entertainment, and you won't be disappointed.

● **Corey Gunnestad**



#### BLU-RAY 3D

STUDIO: Universal, 2015

ASPECT RATIO: 2.40:1

AUDIO FORMAT: DTS-HD Master Audio 7.1

LENGTH: 124 mins.

MPAA RATING: PG-13

DIRECTOR: Colin Trevorrow

STARRING: Chris Pratt, Bryce Dallas Howard, Vincent D'Onofrio



## A ROOM WITH A VIEW

Criterion Collection



*A Room with a View* is one of the most romantic films of all time—a funny, leisurely, unabashed, but also ironic celebration of “beauty, joy, love,” (as its youthful hero shouts from a flimsy treetop in the Italian countryside).

Based on E.M. Forster's novel, it remains the most successful film by Merchant Ivory, the enterprise consisting of producer Ismail Merchant, director James Ivory, and screenwriter Ruth Prawer Jhabvala. I'd found (and still find) many of their other movies dull, so what jelled with this one? The infectiously gorgeous setting—Florence, its surroundings, and the estates of southeastern England—must have played some role. The actors are as fine an ensemble as any assembled (besides the three listed below, Denholm Elliott, Daniel Day-Lewis, Judi Dench, Simon Callow, Rupert Graves). The ravishing soundtrack, mainly Puccini as sung by Kiri Ti-Kanawa, certainly helps. The hidden gem may be the adaptation by Jhabvala (the unsung peg of the Merchant Ivory trio), who brings to life Forster's vast caravan of characters and dramatizes his themes—the disruptive transition from Victorianism to modernism at the turn of the 20th century, with its breakdown of barriers in class, gender, and nationalities—in subtle but wallop fashion, without overloading the clear, breezy story line of a provincial young woman in the throes of self-discovery.

There's also, of course, Tony Pierce-Roberts' lush cinematography, and the Criterion Collection's 1080p transfer—mastered from a 4K scan of the 35mm camera negative—excites and soothes the senses. With saturated colors, suffused with light, rich in detail, the Blu-ray Disc might look even better than the theatrical prints, which suffered from chroma shifts (caused by a lab error) that Criterion has corrected, under

Pierce-Roberts' and Ivory's supervision.

The 2.0 soundtrack was remastered at 24 bits from the 35mm magnetic tracks, and it's clear, dynamic, lustrous.

The special features are a bit scanty for a Criterion blockbuster—two brief new documentaries, one with the actors reminiscing, the other with the director, D.P., and designer doing the same—but they're interesting, not least the revelation that the Hollywood funder wanted to change the story completely, excising all the old people and turning the leads into Americans, played by John Travolta and Glenn Close. Merchant talked him out of it. Could any producer resist the pressure today? ● **Fred Kaplan**



#### BLU-RAY

STUDIO: Criterion Collection, 1985

ASPECT RATIO: 1.66:1

AUDIO FORMAT: 2.0 Dolby Surround

LENGTH: 117 mins.

MPAA RATING: ---

DIRECTOR: James Ivory

STARRING: Helena Bonham Carter, Maggie Smith, Julian Sands





## BRAM STOKER'S DRACULA

### LOVE NEVER DIES

Sony



Fourteenth-century prince Vlad Dracula ushers off on a religious crusade to battle his enemies, leaving the love of his life in his gothic castle. Before he returns victoriously, the evil Turks send word to his bride that he has died in battle. Beset with grief, she commits suicide, and upon seeing her lifeless body, Dracula denounces the church in a fit of rage and becomes an undead man whose eternal existence requires him to feed off the blood of other living creatures. Four hundred years later, a London real-estate broker visits Dracula in Transylvania. When Dracula happens upon a picture of the agent's fiancée and notices her striking resemblance to his deceased bride, he must travel to London to gaze upon her beauty for himself and rediscover true love.

Bram Stoker's 1897 novel *Dracula* has been adapted by Hollywood numerous times over the past 100 years with mixed results. Francis Ford Coppola's rendition is dark and erotic, and upon my first viewing back in 1992, I didn't like it at all. Now, 24 years later, I appreciate the artistry in the project and the painstaking process Coppola went through to deliver the tale in as authentic a way as possible.

It's a mixed bag on how well early '90s vintage films translate to Blu-ray, but Sony has done a commendable job with this "Mastered in 4K" restoration. The image is relatively sharp, with adequate detail and natural film grain that hasn't been digitally scrubbed from existence. Shadows are a tad murky and colors somewhat muted, but this is by design.

The audio engineers created a new Dolby Atmos (TrueHD 7.1 core) mix for this release with excellent results. The object-based audio presentation is well crafted and not gimmicky in its implementation. The overhead speakers are used to encompass the room with score bleed and the occasional discrete effect adding to the film's creepiness factor.

The supplements include deleted scenes, an audio commentary and introduction by Coppola, four production featurettes, and a UV Digital Copy. Additionally, the deluxe new Supreme Cinema Series packaging includes 24 pages of photos, a written introduction by Coppola, as well as a comprehensive behind-the-scenes look at the production. Unfortunately, the book's hard plastic covers don't rest well in the hands, and its spine is rather flimsy.

Although it's a flawed film in some ways, it tells an interesting story and sounds amazing in Atmos. **David Vaughn**



#### BLU-RAY

**STUDIO:** Sony, 1992  
**ASPECT RATIO:** 1.85:1  
**AUDIO FORMAT:** Dolby Atmos/TrueHD 7.1 core  
**LENGTH:** 128 mins.  
**MPAA RATING:** R  
**DIRECTOR:** Francis Ford Coppola  
**STARRING:** Gary Oldman, Anthony Hopkins, Winona Ryder



## MONKEY KINGDOM

Disney



Directors Mark Linfield and Alastair Fothergill (*Earth*) return to DisneyNature with the beautifully filmed documentary *Monkey Kingdom*, which follows a troop of macaques living in the ruins of a Sri Lankan temple. The story hones in on a female named Maya and her newborn son Kip. The lowborn Maya must work her way through the complex hierarchy of the macaques in her struggle to survive and feed her son.

The film is very family-friendly in that familiar Disney way, glossing over some of the more intense incidents. The anthropomorphizing of these cute creatures is an effective tool for the storytelling, and the lighthearted, comically tinged narration by Tina Fey helps it all go over easily. For adults and kids alike, the beautiful camera work offers more than enough eye candy to keep us glued to the screen. The beautiful jungle backdrops and taut editing will place you right in the middle of this heartwarming and quick-paced adventure.

*Monkey Kingdom* on Blu-ray boasts an AVC 1080p transfer that is absolutely magnificent. This is the kind of clarity we want to see in a nature documentary. An obvious digital production, there are nonetheless no signs of video noise, color banding, aliasing, or motion artifacts, and the color reproduction is wonderfully natural. Details are crisp: We can see every strand of fur on the monkeys, every crinkle on their faces, and every leaf in the forest.

Disney includes a DTS-HD Master Audio 5.1 soundtrack that has a big, ambient sound that reminded me of the kind of mixes you usually hear on IMAX exhibition films when they arrive on Blu-ray. The atmospherics in the surround channels are plainly audible and reverberant,

Fey's voiceover in the center channel is upfront and full, and stereo panning across the front is wide. Low end is deep but never boomy. At all times, the mix sounds well balanced and punchy.

*Monkey Kingdom* comes with a fine complement of extras. The highlights include the featurette "Tales from the Kingdom," which provides a behind-the-scenes look at the ten camera crews working over three years and "On the Set of *Monkey Kingdom*," which brings in the always-good-to-see primate experts Jane Goodall and Wolfgang Dittus. There's also a music video by Disney artist Jacqui Lee and a message on conservation. Finally, Disney includes a DVD of the feature and a Disney Movies Anywhere Digital Copy.

**Brandon A. DuHamel**



#### BLU-RAY

**STUDIO:** Disney, 2015  
**ASPECT RATIO:** 1.85:1  
**AUDIO FORMAT:** DTS-HD Master Audio 5.1  
**LENGTH:** 81 mins.  
**MPAA RATING:** G  
**DIRECTORS:** Mark Linfield, Alastair Fothergill  
**STARRING:** Tina Fey



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## SPARTACUS

### STAND UP, BE COUNTED

Universal



Stanley Kubrick's legendary depiction of a slave uprising in ancient Rome has long since entered the annals of cinema history, so there's little else to say about this beloved movie. Produced long before the advent of digital filmmaking, it is an ambitious masterpiece, an incredibly lavish undertaking with scenes that assemble thousands of extras while driving home the story of one man making all the difference in the world.

As long as I can remember, *Spartacus* has been Universal's ugly duckling, not once receiving the home video treatment a movie of this caliber deserves—despite several attempts—forced instead to languish with unanimously disappointing transfers. But the gods are smiling upon us at last, because someone at the studio decided it was time to give the film its due.

The new 4K transfer taken from the original film negative is the best-looking version of *Spartacus* we've ever seen. At 56 years old, the movie amazingly reveals not only in vibrant colors but in a breathtaking amount of detail. The newfound clarity is most striking in the finer points of the elaborate costumes, the varied skintones in close-ups, but also the immediacy in the sprawling battle scenes.

The DTS-HD Master Audio soundtrack is also a pleasant surprise, remixed from the original elements of the vintage six-track for this new, high-resolution 7.1-channel creation. The presentation is always sonically transparent, with a wide soundstage and solid bass extension. Once more, we forget the film's age, particularly with regard to the orchestral score by Alex North. Dialogue suffers from narrow-banded equalization that's inherent to the source, but it sounds more balanced, natural, and modern here than before. The surround channels are used mostly for ambient effects.

Along with all of the previously released bonus features, this disc also contains two new featurettes: a conversation with star Kirk Douglas and a look at the audio/visual restoration.

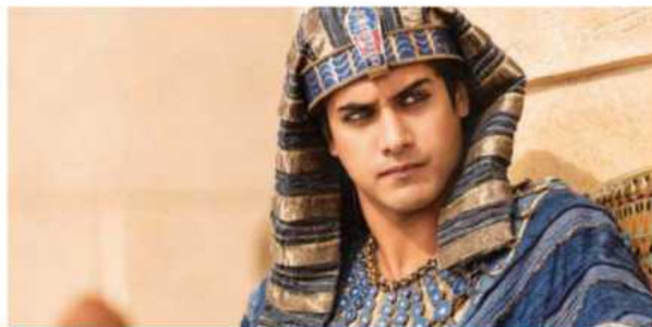
Everything about *Spartacus* is epic, and at long last, it no longer plays like some dated relic that barely found its way to the screen. It now looks as monumental as its grand production decrees, and at the risk of sounding pompous, clearly this is the only version of the film you'll ever need.

● Guido Henkel



#### BLU-RAY

**STUDIO:** Universal, 1960  
**ASPECT RATIO:** 2.20:1  
**AUDIO FORMAT:** DTS-HD Master Audio 7.1  
**LENGTH:** 197 mins.  
**MPAA RATING:** PG-13  
**DIRECTOR:** Stanley Kubrick  
**STARRING:** Kirk Douglas, Jean Simmons, Laurence Olivier



## TUT

### GOLDEN BOY

Muse Entertainment



Egyptian history is astonishingly long by modern standards. The pharaoh Tutankhamun lived roughly 13 centuries after the pyramids were built, and another 13 centuries would pass before Cleopatra friended an asp.

The plot of this two-disc, 4.5-hour miniseries is centered on the limited facts we know about Tut. He was the son of Akhenaten, whose worship of the sun god Aton and rejection of Egypt's traditional deities nearly tore the country apart. Tut became pharaoh around age nine and eventually restored the old gods and stabilized the kingdom. But by the time of his death at a young 19, he had failed to produce an heir by his wife and half-sister Ankhesenamun.

Tut's powerful advisors, the Vizier Ay and General Horemheb, were also historical figures. Both would follow Tut, one after the other, onto the Egyptian throne. And while how Tut died also remains shrouded in controversy, the currently fashionable theory is of a broken leg that became infected—as depicted here.

But significant dramatic liberties were taken. For example, there's evidence pointing to Tut's having genetic physical handicaps that would have kept him from being the warrior king suggested by the series. Without that, much of the miniseries' plot would collapse.

Avan Jogia plays Tut, but it's Ben Kingsley who headlines in the meaty part of the shift. . .um...Ay. Fans might also recognize Nonzo Anozie (from *Ender's Game*) as General Horemheb and Alexander Siddig (from *Star Trek: Deep Space Nine*) as the high priest Amun.

But be warned: There's a lot of graphic violence in this Spike TV series, as well as enough soft porn to make HBO envious—enough to suggest keeping it away from children (and the squeamish). If it were a movie, it would be a hard R.



#### BLU-RAY

**STUDIO:** Muse Entertainment, 2015  
**ASPECT RATIO:** 1.78:1  
**AUDIO FORMAT:** DTS-HD Master Audio 5.1  
**LENGTH:** 270 mins.  
**MPAA RATING:** N/A  
**DIRECTOR:** David Von Ancken  
**STARRING:** Ben Kingsley, Avan Jogia, Alexander Siddig



The production is lavish, with slick period costumes and almost too-perfect sets (likely heavily CGI'd). These qualities alone, together with the crisp, flawless transfer, might well have you humming the scenery. The plot did slog along more than enough through the middle to test my desire to soldier on, but I did. And while the clean, crisp sound is short of what you'll get from a dynamic feature film, it's more than adequate for the job and never a negative distraction. This series, and its short but sweet extras, are also available for streaming from Amazon Instant Video, but the picture and sound quality on these Blu-rays are far superior. ● Thomas J. Norton





## THE WORLD ACCORDING TO GARP

### THE GIFT OF ROBIN WILLIAMS

Warner Bros.



The Warner Bros. Archive Collection has remastered and released another contemporary classic from their vaults: *The World According to Garp*, and a welcome arrival it is. Adapted from the novel by John Irving and released back in 1982, this quirky comic drama featured star-making performances from three relative newcomers: Glenn Close, John Lithgow, and a gifted young comedian named Robin Williams. Appropriately, Lithgow and Close were both nominated for Academy Awards for their supporting performances, but it was several years too soon for Williams to be taken seriously as a dramatic actor. George Roy Hill, who directed Paul Newman and Robert Redford in *Butch Cassidy and the Sundance Kid* and *The Sting*, showed inspired brilliance in giving the lead role to Williams, an actor whose only prior characterizations were a manic alien named Mork from Ork and a one-eyed sailor named Popeye.

*The World According to Garp* has received an excellent transfer typical of the standards set by the Warner Archive Collection. It rivals all previous home video editions thus far, but that shouldn't surprise anyone. The HD image exhibits sharp clarity and detail, and scratches and dust particles are absent. Pixelated grain is most noticeable in daylight exterior shots, but fleshtones are consistent and even throughout. The limitations of the remastering process are evident in the disappointing 2.0 HD Master Audio. This is no doubt a step up from all previous editions, but one still longs for more directionality from the surround speakers. Still, for an '80s period drama, the sound performs quite adequately.

Like the Warner Archive edition of *Ladyhawke*, *Garp* is woefully absent of any special features beyond the theatrical trailer. The disc is also completely devoid of any chapter search prompt from the main menu. And with no "movie memory," either, it's something of a pain in the ass if you wish to continue watching from where you left off the night before.

Minor gripes aside, *Garp* has never looked better and is a fine addition to the Warner Archive Collection for fans of the film like me. A little more effort would have gone a long way, though. Robin Williams' performance as T.S. Garp ranks with some of his best, and watching it only a year after his death, it's also a heartbreaking reminder of just how poorer the world is without him. If you've not seen this remarkable little film, buy it, rent it, Netflix it, do what you must. But watch it. ● **Corey Gunnestad**



**BLU-RAY**

**STUDIO:** Warner Bros., 1982  
**ASPECT RATIO:** 1.85:1  
**AUDIO FORMAT:** DTS-HD Master Audio 2.0  
**LENGTH:** 136 mins.  
**MPAA RATING:** R  
**DIRECTOR:** George Roy Hill  
**STARRING:** Robin Williams, Glenn Close, John Lithgow



## THE WATER DIVINER

### TURKEY SHOOT

Warner Bros.



As directed by Russell Crowe from the book of the same name by Andrew Anastasios and Dr. Meaghan Wilson-Anastasios, *The Water Diviner* is part (anti-) war story, part romance, part history lesson, and part travelogue. Four years after the Battle of Gallipoli in which he lost his three sons, Joshua Connor (Crowe) is driven by the suicide of his wife to leave his Outback farm to go to the battlefield in search of their remains. On the way, waiting to get a permit from the occupying English forces, he stays in a hotel in Istanbul run by a beautiful war widow who, along with her young son, helps him to understand their country, culture, and customs, and he soon finds himself protectively drawn to them and to Turkey. With this simple story, Crowe creates a moving film with the atmosphere of loss over death, often allowing the Turks, who suffered deeply in defense of their homeland, to tell of the fighting from their perspective—a very different portrait than in *Lawrence of Arabia*.

Scenes set in post-war are gently and evenly lit and filled with pale browns and yellows of the Turks' uniforms, earth, and church pews occasionally set off by their rich red flags and fezzes. Blacks, such as a priest's cassock, are deep, the collar a bright white. Scenes of the battlefield are sharper, with greater contrast and detail, giving textures to the in-depth shots of trenches and making wood grain, weave in rough shirts, and lace curtains all tactile. Decorations and stained glass of the Blue Mosque, patterns in rugs, and the shadowy reflections of water in the underground Basilica Cistern are all well defined.

In deeply bossy Turkish-tinted orchestral music, instruments are well separated into individual channels. All is distinct even in battle scenes when shells booming explode and gunfire sharply snaps off all around. Atmospherics on the farm and in the Istanbul markets are immersive, as are a night of thunder and rain and a highly convincing (and frightening) dust storm that swallows you up as it rages around. Dialogue is clear and full, and effects, such as horses galloping by or trains rattling along, are accurately panned.

The only extras are two short, highly polished, and informative featurettes. One has Crowe narrating over interesting behind-the-scenes footage focusing on casting and location shooting. In the other, Crowe intelligently explains the history behind the bloody slaughter at Gallipoli.

● **Josef Krebs**



**BLU-RAY**

**STUDIO:** Warner Bros., 2014  
**ASPECT RATIO:** 2.39:1  
**AUDIO:** Linear PCM 5.1  
**LENGTH:** 111 mins.  
**MPAA RATING:** R  
**DIRECTOR:** Russell Crowe  
**STARRING:** Russell Crowe, Olga Kurylenko, Yilmaz Erdogan





## THE BLACK STALLION

A HORSE MADE FOR OLED

Criterion Collection

Author Walter Farley's sweet, timeless tale of a young boy and his special bond with a spirited horse was brought to cinematic life with irresistible visual and sonic beauty, more appreciable than ever on Criterion's fantastic new Blu-ray. Our boy, Alec (Kelly Reno, what a find), is washed ashore on a remote island after a shipwreck, and the only other survivor is a magnificent Arabian stallion. Their time alone together is a prolonged marvel of wordless storytelling, while the post-rescue second half is quite a different animal, as a grizzled old trainer (a wonderfully cast Mickey Rooney) agrees to prepare the horse to race. It's a thrilling adventure for kids, but without the sap that might otherwise send the adults fleeing.

*The Black Stallion* was transferred from the original 35mm camera negative at 4K and restored at 2K, supervised by director of photography Caleb Deschanel and approved by director Carroll Ballard. The results are often stunning, with exceptional clarity and organically nuanced colors, critical because of the extensive use of natural light. The 1.85:1 presentation preserves Deschanel's artful compositions, rich in shadows, which reproduce without issue, and we can discern virtually every sinew on the dark-hided, four-legged co-star. There's quite a bit of film grain carried over to 1080p video, sometimes extremely pronounced.

The movie won a Special Achievement Oscar for its sound editing, and here the DTS-HD Master Audio soundtrack is best enjoyed with Dolby Pro Logic decoding for the intended late-'70s "surround" effect. At 24-bit depth the audio displays remarkable dimension, the mix flaunting clever touches like the rhythmic low-end rumble of the steamship's engine. Dialogue is dependably clear, but the quietude is depicted with equal drama. Frenzied braying combined with massive hoofbeats show off the tremendous dynamic range. The music by Carmine Coppola (father of executive producer Francis) is often sparse, often infused with a Middle Eastern flair, always a listening pleasure.

The supplements include no fewer than five pre-*Black Stallion* shorts by Ballard. There are also new interviews with Ballard and Deschanel, reflecting upon their craft, and a segment about on-set still photographer Mary Ellen Mark, who essentially narrates a slide show of her interesting behind-the-scenes work. **Chris Chiarella**



BLU-RAY

STUDIO: Criterion Collection, 1979  
ASPECT RATIO: 1.85:1  
AUDIO FORMAT: DTS-HD Master Audio 2.0  
LENGTH: 118 mins.  
MPAA RATING: G  
DIRECTOR: Carroll Ballard  
STARRING: Kelly Reno, Teri Garr, Mickey Rooney



## SALT OF THE EARTH

VIZIONARY

Sony

This dazzling documentary tells the biography of celebrated Brazilian photographer Sebastião Salgado, who, drawing with light and shadows, depicts the salt of the earth—individuals in communities of mine workers, survivors of the Rwandan Genocide, or the indigenous tribal people of his native home. All are captured in intensely striking black-and-white photographs of enormous depth and detail. Wim Wenders and Juliano Ribeiro Salgado (Sebastião's son) co-directed the film, bringing their great visual eyes in showing him at work and displaying the results past and recent. "Places, Strange and Quiet," the title of one photography series book, well describes all Sebastião Salgado's work and it's a breathtaking journey.

Contrast in the transfer is at times near perfect with deepest blacks and a gorgeous vast range of grays, allowing the full force of the many photographs to come through in all their wondrousness. As the film occasionally, almost imperceptibly changes into color, plentiful subtle greens and purples of the mountainside, richly colored pottery, and natural skintones are revealed. This footage is not always as striking and sometime is less well contrasted or softer. But when the cinematography returns to black and white, emulating Sebastião Salgado's photography or just showing the stills, it's staggeringly beautiful.

In narrative and discussions by Wenders and the Salgados, voices are crisp, full, and immediate as if in the room. Rarely have I heard a soundtrack so clear and natural. It also includes a moving, immersive score of string music, well separated into each channel, adding a mythic quality to the stunning visuals often of misery, political disasters, and famine. Surrounds are also used for atmospherics like the sound of wind blowing around landscapes, cicadas, and birdcalls.

Many more haunting pictures and footage are offered in both 35 minutes of outtakes in which Sebastião Salgado describes his subjects and a featurette summing up the production process and difficulties of co-directing. In a highly involving commentary, Wenders tells how a casual dropping by to finally meet his favorite photographer gradually turned into a film, while Juliano Salgado relates his personal experiences in a shoot that brought him immensely closer to his father who had spent so much of his life away from his family traveling through the wilderness in search of visions. **Josef Krebs**



BLU-RAY

STUDIO: Sony, 2014  
ASPECT RATIO: 1.85:1  
AUDIO: DTS-HD Master Audio 5.1  
LENGTH: 110 mins.  
MPAA RATING: PG-13  
DIRECTORS: Wim Wenders and Juliano Ribeiro Salgado  
STARRING: Sebastião Salgado, Wim Wenders, Juliano Ribeiro Salgado







## LOVE & MERCY

OWIN' WILSON

Lionsgate



A year before The Beatles released *Sgt. Pepper*, Brian Wilson had completed "Good Vibrations," the first pop song with orchestral backing and the most expensive single ever produced. By then, its genius composer had begun his descent into madness, which, by the 1970s, would find him bedridden for several years before being placed under the care of Dr. Eugene Landy (Paul Giamatti). Astonishingly accurate to its finest detail, *Love & Mercy*, which flashes between Wilson, "Rock Star" prodigy of the mid-'60s (Paul Dano) and "Rock Bottom" burnout of the late '80s (John Cusack), is compelling on historical, musical, and emotional levels.

According to the illuminating, full-length commentary by director Bill Pohlad and co-writer Oren Moverman, Wilson is such an "analog guy" that the movie was shot on film stock, much of which—including the documentary-style recording studio scenes of Wilson—is 16mm. Video is purposely given a dated feel, from the grainy, saturated credit sequences of Beach Boys performances to the muted, sterile scenes of Wilson alone in his bedroom. Image quality is therefore a moving target, changing from scene to scene to fulfill the director's intent, which makes it difficult to critique. That said, fine details of hair, skin, and clothing are sharply rendered. Although earth tones predominate, colors pop with excellent dynamic clarity. Blacks feature stunning gradation with fine shadow detail, while whites, though occasionally crushed, offer good depth and are rarely washed out. This digital transfer suffers no noticeable edge enhancement.

Sound, on the other hand, is at once consistent and consistently superb. Given its musical focus, Beach Boys tunes and Atticus Ross' clever soundtrack are ravishingly resolved. Particularly impressive were several scenes that chronicle our hero's descent into madness. Dynamics are sharp and impactful, while trebles are extended with textbook-perfect transient attack. Just as impressive is the description of three-dimensional space. Even the softest sounds are complex and richly detailed, while dialogue clarity is unimpeachable.

Along with the commentary, extras include an engaging making-of documentary. Indispensable for its biographical brilliance, *Love & Mercy* is essential viewing for pop-culture historians and music lovers alike... not to mention movie lovers.

● Anthony Chiarella



BLU-RAY

**STUDIO:** Lionsgate, 2015  
**ASPECT RATIO:** 1.78:1  
**AUDIO FORMAT:** DTS-HD Master Audio 5.1  
**LENGTH:** 122 mins.  
**MPAA RATING:** PG-13  
**DIRECTOR:** Bill Pohlad  
**STARRING:** John Cusack, Paul Dano, Elizabeth Banks



## PITCH PERFECT 2

EYE OF THE TIGRESS

Universal



In an era when *Glee* was everywhere, moviegoers understandably didn't flock to see the seemingly similar *Pitch Perfect* on the big screen, but Blu-ray/DVD and TV showings ultimately brought the charming comedy the audience it deserved. Three years later, the mettlesome young songstress from Barden University are back, eager to win an international competition with the help of a new recruit. Returning co-star/producer Elizabeth Banks also makes a triumphant directorial debut with *Pitch Perfect 2*, seamlessly maintaining the ongoing franchise's breezily mean-spirited humor while staging many memorable new cover versions of eclectic pop tunes.

The Blu-ray is worthy of heartfelt praise as well. Colors are remarkably bold in the too-perfect *Pitch Perfect* world, with generous details appreciable everywhere we'd expect within the 1.85:1 frame. Even billowy theatrical smoke is naturally resolved, and the jet-black hair on some of the ladies is richly nuanced. Flaws are minimal, even excusable, as in the virtually unavoidable moiré in long shots of a large LED video wall.

The overall character of the DTS-HD Master Audio 5.1 soundtrack is quite different from the usual home theater showoff fodder but is nonetheless impressive. The high resolution affords a wide dynamic range that lets us savor the sonic truth of these genuine, unaccompanied singing voices, with ample low end whenever they drop that bass. The multichannel mix is certainly convincing, with a realistic simulation of an auditorium's P.A. system, the occasional discrete placement of characters, and the more general representation of a cappella-loving crowds.

Most substantive among the extras is an audio commentary from Banks and her fellow producers. Additional music is assembled for our further enjoyment, including extended performances and a fascinating breakdown of Das Sound Machine's final jam that serves as a serious lesson in audio mixing. Twelve minutes of deleted/alternate/extended scenes offer an interesting glimpse of what might have been, the gag reel is good for a few laughs, but the long succession of brief behind-the-scenes featurettes is perhaps best left to the most devout fans. The Blu-ray is even BD-Live-enabled, for Internet-connected players, and a DVD and multi-format Digital Copy of the movie are bundled here as well. ● Chris Chiarella



BLU-RAY

**STUDIO:** Universal, 2015  
**ASPECT RATIO:** 1.85:1  
**AUDIO FORMAT:** DTS-HD Master Audio 5.1  
**LENGTH:** 115 mins.  
**MPAA RATINGS:** PG-13  
**DIRECTOR:** Elizabeth Banks  
**STARRING:** Anna Kendrick, Rebel Wilson, Hailee Steinfeld



FIVE YEARS – 1969-1973

## DAVID BOWIE

Brian Ward - The David Bowie Archive (1971)



emerge with each successive listen, like the vocal echo on the near-prog of “The Width of a Circle” and the supplemental percussion on the title track to *The Man Who Sold the World* (1971). *TMWSTW*’s broader palette set the table for *Hunky Dory* (1971) and most importantly “Changes,” wherein Bowie turned and took ch-ch-ch-ch-charge of his creative direction alongside simpatico producer Ken Scott. Listen how the piano figures and strings are held back just enough for the reflective lead vocals to shine on their own during the verses, the way the volume on the choruses and the bridge increases for

“Five years—that’s all we’ve got.” That ominous prognostication, put forth by David Bowie ostensibly about an Earth heading toward imminent destruction in the opening track to 1972’s incendiary game-changer *The Rise and Fall of Ziggy Stardust and The Spiders From Mars*, also serves as a fitting epigraph for both the core title and scope of this massive box set, the first in what will likely prove to be a series that will go well beyond merely making the grade.

Rhino, under the Parlophone umbrella, is rolling out a series of Bowie boxes that will represent most, if not all, key phases of the artist’s mercurial and groundbreaking career, and what better way to kick it off than by spotlighting the first half-decade one David Robert Jones inhabited as the character of David Bowie, the genre-busting gender chameleon whom he continues to embody to this day (albeit in a state of semi-retirement).

*Five Years* is available in a number of configurations, including a 12-CD set, 13-LP set, and high-resolution digital download 192-kHz/24-bit and 96/24 options. In this case, my preferred *Five Years* listening method has been via the 180-gram vinyl collection, which will also be quite revelatory to any set of ears having been attuned to digital-only Bowie.

“Space Oddity,” the lift-off track of Bowie’s self-titled 1969 debut, initiated our literal spatial relationship with the man, and this 2015 remaster is pure cosmic aural bliss. The right-channel acoustic-guitar fade-in meshes beautifully with Terry Cox’s light-but-deft militaristic drumming in the left, while Bowie’s right-channel lead vocal balances with his left-channel countdowns and counter vocals, with (yes) Rick Wakeman’s masterful mellotron ethereally wafting in and out of all the right spots down the middle. And oh, that swirling 2001-meets-“A Day in the Life” hazy-dreamy ascending outro! The mono single edit of “Oddity” included on the first bonus disc of *Re: Call I* takes a mellower approach, and while it’s interesting in terms of its relative self-containment and dramatic volume swells, I prefer the stereo version. (More about the totality of *Re: Call I* in a bit.)

From there, Bowie took off in our collective cultural consciousness, and he dared us to keep up with his every sonic step. The finer details

the proper effect, and the abject air of joy apparent in Bowie’s own elegiacally sweet sax solo that ends the track.

And then, Ziggy played guitar. The included 2003 stereo remix of *Ziggy Stardust* done by original producer Ken Scott remains an improvement—though I do wish the CD box set had also included Scott’s stellar surround-sound mix that’s available in the 2012 *Ziggy* package. Meanwhile, *Live Santa Monica ’72* and *Ziggy Stardust: The Motion Picture Soundtrack* (1973) capture the unbridled raw energy of the Spiders band, especially guitarist Mick Ronson’s punk-prescient verve and fury on *Soundtrack* cuts like “Cracked Actor” and “Suffragette City.” But even when Bowie shockingly announced prior to the aptly titled “Rock n’ Roll Suicide” that “It’s the last show that we’ll ever do,” the next phase was already underway.

*Aladdin Sane* (1973) led that phase, pushing boundaries even further with hard-chargers like “Panic in Detroit” and “The Jean Genie,” though the album’s overall mix from 2013 is a half-step behind the breadth of the others done in 2015. *Pinups* (1973) followed, and rather than acting as a mere stopgap measure, this covers record re-invigorated early- and mid-’60s classics like Pink Floyd’s dream-dirge “See Emily Play” and

The Who’s prepubescent angst anthem “I Can’t Explain.”

The collection’s added gem is clearly the earlier noted *Re: Call I*, the double-disc compilation of non-album singles and B-sides. Among its standouts: the frenzied build in the mono single edit of “All the Madmen” and the original, Queen-like Spiders version of “Holy Holy.”

Look out, you rock n’ rollers: Our strange fascination with David Bowie is only going to continue to evolve, and *Five Years* lets us watch that man during his initial growth period rise far above the world. ● Mike Mettler



Vernon Dewhurst (1969)



Brian Ward - The David Bowie Archive (1972)

## CD &amp; LP

LABEL: Parlophone

AUDIO FORMAT: 44.1-kHz/16-bit PCM Stereo (CD), 192-kHz/24-bit PCM Stereo, 96-kHz/24-bit PCM Stereo (download)

NUMBER OF TRACKS: 135 on 12 CDs and 13 LPs

LENGTH: 8:46:09

PRODUCERS: Nigel Reeve, Jo Blair, Henry Wrenn-Meleck (box set); Ray Staff, John Webber (transfers and mastering); David Bowie, Gus Dudgeon, Tony Visconti, Ken Scott, Richard Kimball, Claudio Fabi (original albums and bonus material)

ENGINEERS: Ken Scott, Malcolm Toft, Barry Sheffield, Gerald Chevin, Eddy Offord, Mike Moran, Denis Blackeye

PERFORMANCE ★★★★★  
SOUND ★★★★★





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# Reaching Nirvana

Pioneer SE-MASTER1 Limited-Edition Headphone

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When I picked up Pioneer's SE-MASTER1 headphone at CEDIA Expo in October, I knew it was special. Sub-

stantial yet lightweight and exceptionally well crafted with scrupulous attention to detail, right down to the contoured ear cushions and engraved serial number. (Sorry, S/N 00001 is already spoken for.) If you were to crack open the ear cups, you'd find the same commitment to excellence in the form of a highly refined ceramic-coated aluminum diaphragm surrounded by a ribbed ring, designed to reduce distortion, all framed in a sturdy aluminum alloy to minimize resonance.

Each open-back headphone is hand-built by a master craftsman at Pioneer's Tohoku Plant in Japan—the same place where high-end TAD speakers are made. The headphone's core components—a pair of 2-inch drivers, each comprising 13 carefully aligned parts—is a serious work of engineering art whose sole mission is to transform electrical signals into delightfully natural sound.

To realize that goal, Pioneer enlisted the help of London's world-famous AIR Studios to tune the

SE-MASTER1—a process AIR technical director Tim Vine-Lott called challenging. "Headphones have none of the adjustable electric circuits you find in amplifiers or speaker systems, and the smallest change could have unexpected effects on sound quality; but working with Pioneer's engineers, we were able to achieve the best sound quality."

Pioneer invited me to audition the SE-MASTER1 in a back-room demo. The urgency of my trade-show schedule quickly disappeared as I settled in to listen to an assortment of Hi-Res files, ranging from metal to all flavors of pop. The sound, which was fed through the high-resolution DAC in Pioneer's U-05 headphone amplifier, was airy and revealing in a way I didn't expect from a headphone. I kept coming back to "Come as You Are" from Nirvana's seminal 1991 album, *Nevermind*. I heard subtleties in the mix I had not noticed before, and Kurt Cobain's signature guitar—and the space around it—was positively huge. Before I knew it, the marketing rep was knocking on the door. My time was up.

These are not small headphones by any stretch of the imagination, but Pioneer has paid careful attention to flexibility and comfort by including a detachable, tangle-free 10-foot cord, adjustable headband, memory-foam earpads, and a tension rod that can be swapped out to fine-tune (lateral) headband tension. The SE-MASTER1 does not come cheap, but it has a lot to offer for \$2,500.—*Bob Ankosko*



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